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ABSTRACT

This manual is designed to help classroom teachers in Alberta, Canada implement the Junior High Computer Studies Program. The first eight sections cover the following material: (1) introduction to the teacher resource manual; (2) program rationale and philosophy; (3) general learner expectations; (4) program framework and flexibility; (5) program planning, use of time, and resources; (6) integration into other subjects; (7) learning resources; and (8) specific learner expectations. The next five sections contain 25 learning modules listed by theme (applications, keyboarding, productivity, programming, and society), each of which contains suggested student activities, integrated activities, and learning resources designed to meet specific learner expectations. The final four chapters discuss sample lesson plans; facilities, hardware, and software; evaluation; and program support resources. Supplementary instructional materials are appended and a glossary concludes the manual. The three programs on two computer disks that accompany the manual are not included in this document. (15 references) (DB)

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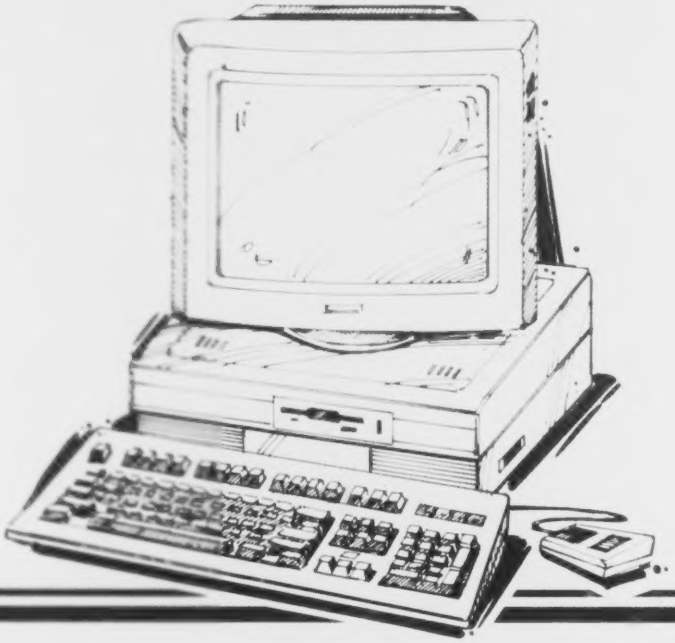
Junior High
COMPUTER STUDIES

TEACHER RESOURCE MANUAL

1990



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Junior High Computer Studies
Teacher Resource Manual

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INTRODUCTION TO THE TEACHER RESOURCE MANUAL

Purpose

This teacher resource manual (TRM) is designed to help teachers implement the Junior High Computer Studies Program. The TRM is a support document that provides helpful information to classroom teachers. The teaching and evaluation strategies presented are suggestions only and are not mandated. Junior High Computer Studies Program of Studies outlines the course teachers are required to teach. Where portions of the Program of Studies are restated in the TRM, they are screened to indicate their legal status.

The TRM provides background information on the rationale and philosophy of the program. A large part of the TRM is devoted to describing teaching strategies and activities appropriate for junior high computer studies. The TRM also provides suggestions for organizing, teaching and evaluating the program and lists print and media materials that support it.

Organization

The TRM is designed to accompany the Junior High Computer Studies Program of Studies. The background of the program is presented first and should be read carefully by everyone who will be teaching the course.

The planning section in the TRM provides useful suggestions that are intended to help the classroom teacher effectively use the time and resources available to meet the goals and objectives of the Junior High Computer Studies Program. The sample activities suggested for computer studies follow each of the modules, providing teaching activities that will help achieve the objectives stated for each theme in the Program of Studies. The learning resources section lists basic and support resources that have been approved for use with students, as well as additional teacher resources. The program support resources section provides addresses of the 12 resource/media centres in the province as well as the ACCESS dubbing service.

Three programs on two computer disks accompany the *Junior High Computer Studies Teacher Resource Manual*.

1) Kid Mail 5.0 – This is a program that simulates an electronic bulletin board system. The program is accessed by booting the disk on an Apple II computer. Documentation is provided on the disk and may be printed by typing RUN PRINT DOCUMENTATION. See Module 14 teacher tips for more information. Kid Mail is provided, with the permission of Computer Using Educators Inc. (CUE), as public domain software and may be freely copied.

2) Graphic Utilities by George Millar – This utility contains two graphic programs accessed by booting the disk on an Apple II computer and selecting the desired program from menu provided. Master Graphics is a low-resolution sketching program with tutorial included and with extra instructions in Handout 15 (see Appendix). Graphic Master is a

high-resolution sketching program with tutorial included. Both programs are provided, with the permission of George Millar of the Edmonton Public School Board, as public domain software and may be freely copied and modified to suit your requirements.

3) TRM Data Disk – This disk provides sample lesson plans and checklists stored as Appleworks files to be used with the teacher resource manual. Files may be accessed through "Add files to the desktop" option on main menu of Appleworks program. These files are public domain and may be freely copied and modified to suit your requirements.

Note: Make a **backup copy** for each disk **before** using it.

Teachers are encouraged to use this manual as a practical planning and instructional tool. It is hoped that teachers will add their own materials and replace those that do not suit the unique needs of their classes. The document is produced on white paper to facilitate duplication.

PROGRAM RATIONALE AND PHILOSOPHY

Rationale

In 1985, the *Secondary Education in Alberta* Policy Statement stated that:

> "Growing demands are placed on secondary schools to provide for the educational needs of all students. Access to better educational opportunities is possible by integrating advances in technology such as computer networking, electronic communications, and other new developments in distance education and individualized learning. The application of technology in the classroom to enhance learning will require a collective vision and cooperation among many community agencies involved in the delivery of secondary education programs. Finally, students must understand the concept, the potential impact and the use of technology."

and

> "The secondary education system must use technology to enhance learning and to facilitate access to equitable educational opportunities for all students, regardless of ability, circumstance or location."

Students should be able to use computer technology to enhance their learning and to gain access to educational opportunities throughout their lives. To this end, **the computer studies complementary program will promote the integration of computers into student learning**. The program is based on two beliefs: first, all students need to have some minimal knowledge of computers, particularly from the point of view of the computer as a productivity tool and learning tool (learning with and through computers); second, students who wish to pursue their study in this area have the opportunity to participate in a complementary computer studies program (learning about computers).

Philosophy

The philosophy of this program is based on the following major principles:

- Students should be able to use computer technology to enhance their learning in all subject areas and to gain access to educational opportunities.
- A computer studies program should provide flexibility in accommodating the needs of students and should recognize the technical and human resources available for program implementation.
- A computer studies program should accommodate students with varying experiences and entry skills.
- A computer studies program should accommodate the needs of schools at "early" and "mature" stages of computer integration into other subject areas.

This computer studies program is flexible to accommodate schools with varying facilities, stages of computer integration and teacher expertise, and students with varying entry levels of skills and experience. Students have the right not to repeat learner expectations already mastered.

To be consistent with the philosophy of this program, teachers should teach toward more than one set of learner expectations with more than one group of students at the same time.

GENERAL LEARNER EXPECTATIONS

Students will:

- demonstrate an ability and willingness to use computer technology as a learning and productivity tool in this program and in other subject areas
- demonstrate an understanding of the power and limitation of computer technology
- demonstrate an understanding and appreciation of the impact that computer technology has on their lives, on their community and on society
- pursue personal interests in computer technology while recognizing appropriate applications in the home and workplace.

Specific Learner Expectations

Specific learner expectations have been identified for each module in the statement of Content which follows.

CONTENT

Program Framework

The Junior High Computer Studies Program is a three-year program divided into five themes:

Theme 1: Applications
Theme 2: Keyboarding
Theme 3: Productivity
Theme 4: Programming
Theme 5: Society

Each theme contains five modules, for a total of 25. Six of these 25 modules have been designated as **mandatory**; that is, these six modules represent the **minimum requirements** of the first year of the program. They are:

Module 1: Computer Operations
Module 6: Keyboarding - Introduction
Module 7: Keyboarding - Full Keyboard
Module 11: Word Processing - Introduction
Module 16: Programming - Introduction
Module 21: Societal Issues - Introduction.

All learner expectations from these mandatory modules must be achieved before students proceed to other modules.

All modules, except Module 1, have been designed to be completed in six to twelve hours of instructional time. Module 1 has been designed to be completed in four to six hours. Completion of the six mandatory modules is intended to require 75 hours of class time with the opportunity built in for enrichment or remediation to meet the individual needs of students.

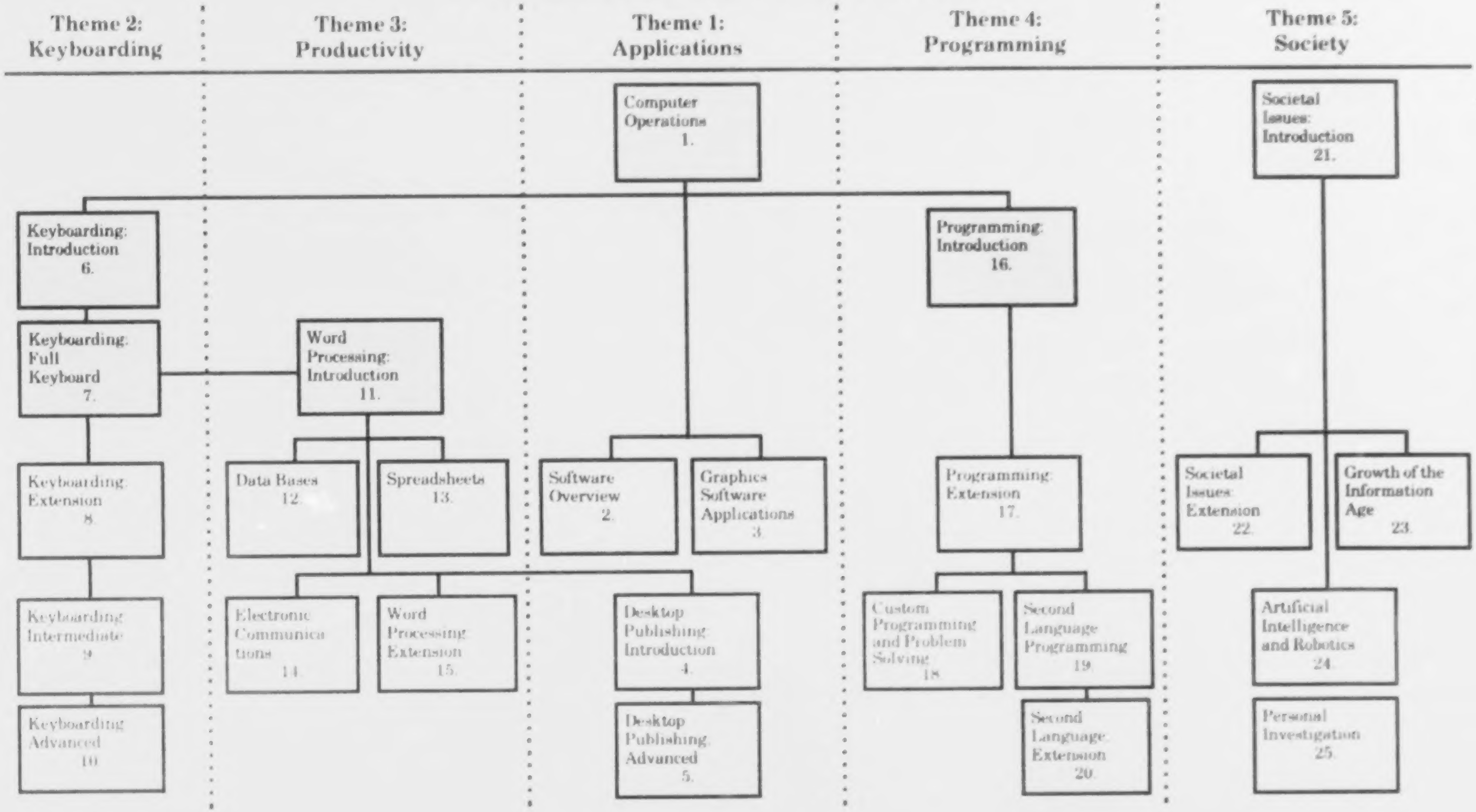
Some modules have been identified as **prerequisite** modules, and a student should proceed in a sequence that takes prerequisite modules into account. Such a sequence is intended to be followed in order to reduce the adjustment problems students may encounter, as well as to increase the carry over from one module or theme to another. The prerequisite modules should provide students with required skills, understandings or information for subsequent study. Prerequisite modules are identified as such in the specific learner expectations.

It should be noted that during the second and third year of the program, students must take one module from the keyboarding theme and a minimum of four modules from three other themes, for a minimum of five modules per year. It is intended that keyboarding instruction and practice be presented and carried out on a continual basis.

Although the program contains materials sufficient for a three-year program, it may be offered as a one-, two- or three-year program depending on student needs, school facilities and available computer software. The program is flexible and can be adapted to a wide variety of situations from schools just beginning to use computers to schools using computers extensively.

The content of the program can be summarized by the following chart. The shaded areas represent the mandatory modules of the program.

Flow Chart of Computer Studies Modules


Theme 2: Keyboarding
Theme 3: Productivity
Theme 1: Applications
Theme 4: Programming
Theme 5: Society
Computer Operations 1.
Societal Issues: Introduction 21.
Keyboarding: Introduction 6.
Programming: Introduction 16.
Keyboarding: Full Keyboard 7.
Word Processing: Introduction 11.
Keyboarding: Extension 8.
Data Bases 12.
Spreadsheets 13.
Software Overview 2.
Graphics Software Applications 3.
Programming: Extension 17.
Societal Issues: Extension 22.
Growth of the Information Age 23.
Keyboarding: Intermediate 9.
Electronic Communications 14.
Word Processing: Extension 15.
Desktop Publishing: Introduction 4.
Custom Programming and Problem Solving 18.
Second Language Programming 19.
Artificial Intelligence and Robotics 24.
Keyboarding: Advanced 10.
Desktop Publishing: Advanced 5.
Second Language: Extension 20.
Personal Investigation 25.

Note: • ☐ = mandatory modules; the minimum requirements for the first year of the program

• during the second and third year of the program, students must take one module from the Keyboarding theme and a minimum of four modules from three other themes for a minimum of five modules per year.

Program Flexibility

In keeping with the intent of junior high complementary courses as exploratory courses of choice for students, the computer studies program is designed to meet the needs of students with varying entry levels of skills and experience. The six mandatory modules provide an introductory experience for students with limited background; the remaining nineteen modules are designed for students who have met the requirements of the mandatory modules and wish to extend their learning.

Since the computer studies program may involve students for one, two, or three years of study, initial emphasis is placed on using the microcomputer to support instruction and learning (rather than on a study of the machine itself). Students operating on a one-year study at this level would concentrate on meeting the learner expectations identified in the mandatory modules.

This program has been designed in a modular format in order to enhance program flexibility and to ensure that students entering the program can be placed appropriately. Students should have as much flexibility as possible to enter their study at a level consistent with their knowledge and ability. Teachers assessing student competency will be able to place students according to the specific learner expectations listed for each module. Three typical examples are outlined below.

Student A entering the computer studies complementary program with little or limited computer familiarity would be expected to complete the six mandatory modules. Modules 1 and 6 are also identified as being prerequisite for study of other modules and should be completed first. In a second or third year of study, this same student would be expected to complete at least one module from the keyboarding theme and a minimum of four modules from three other themes, for a minimum of five modules per year.

Student B entering the computer studies program with enough background to consider that the requirements for a number (e.g., 3 or 4) of the mandatory modules are completed, would follow a slightly different pattern from Student A. This student would be expected to complete those mandatory modules remaining and then would explore modules from additional themes, keeping in mind the requirement of one module from the keyboarding theme and a minimum of four modules from three other themes for a minimum of five modules per year. In the second or third year of study, Student B would be expected to complete at least one module from the keyboarding theme and a minimum of four modules from three other themes, for a minimum of five modules per year.

Student C entering the computer studies program with enough experience and knowledge to consider the mandatory modules already completed would proceed to more advanced modules, keeping the prerequisite modules in mind. Thus, regardless of "grade level", during the first year Student C would complete other modules as determined by minimum program requirements. During a second or third year, this student would be expected to complete one module from the keyboarding theme and a minimum of four modules from three other themes, for a minimum of five modules per year.

Strategies for assessing student entry levels and for tracking student progress are identified in the teacher resource manual.

PROGRAM PLANNING

This section contains essential program planning topics in the following areas: assessing students' entry skills, student tracking, organizing for learning, grouping strategies, yearly planning and elements of effective lesson planning. The recommended strategies and suggestions for organization are consistent with the philosophy of this program, and the four major program principles:

- Students should be able to use computer technology to enhance their learning in all subject areas and to gain access to educational opportunities.
- A computer studies program should provide flexibility in accommodating the needs of students and should recognize the technical and human resources available for program implementation.
- A computer studies program should accommodate students with varying experiences and entry skills.
- A computer studies program should accommodate the needs of schools at "early" and "mature" stages of computer integration into other subject areas.

Assessing Students' Entry-Level Skills

Students have the right not to repeat learner expectations already mastered.

Critical to this right is the assessment of students' entry-level skills. Students' placement in the program should be based on a teacher's assessment of previously acquired skills and experiences and should not be tied to a grade level. If a student is able to demonstrate mastery of the prerequisite learner expectations, the program is designed to allow him or her to progress to the next level in a modular sequence. The level of achievement can and should be assessed in a number of ways. These may include teacher observation, tests—both written and hands-on computer checks—and competency checklists.

Informal observation and discussions with individual students are quick methods of assessment. These may be appropriate for modules such as Module 1, Computer Operations, where students can quickly demonstrate whether they are familiar with the components and operation of a microcomputer system and have the prerequisite skills to progress to the next module in the sequence.

A competency checklist may be used as a measure of achievement for a variety of modules of instruction. The sample checklist on the following page is based on the specific learner expectations for Module 11,Word Processing - Introduction. It can be used effectively to check student mastery as well as to identify areas of remediation/enrichment.

For a skill area such as keyboarding, achievement should be assessed using a variety of methods including observations, competency checklists and timed drills. Examples of these methods of assessment can be found in the Sample Lesson Plans of the keyboarding theme.

COMPETENCY CHECKLIST SAMPLE

The following sample checklist may be used as a diagnostic tool to determine whether a student has the prerequisite skills to progress to the next module in a sequence.

Students must be able to demonstrate their competence in the areas listed in the checklist below using a word processing package acceptable to the teacher. If the student is unable to demonstrate mastery in any one of the following areas, he/she must return to the module to restudy/practise the missed content. Students who have demonstrated they are capable of all areas listed in the checklist below, are eligible to move on to the next module in their program.

Date ____________________

Student's Name ________________________

	S	NS
Uses correct vocabulary in describing the operation of software (e.g., file, document, word wrap, cursor, scrolling screen display).		
Can explain the advantages of a word processor (e.g., on screen editing, speed, accuracy).		
Describes the difference between a stand-alone word processor and word processing software.		
Demonstrates the steps necessary to use basic functions of a word processing package such as:		

File Management

load an existing file		
save a file to disk		
create a document from scratch		
delete a file		
rename a file		

Word Processing

enter text		
cursor movement		
print a file		
delete text		
find and replace text		
move and copy text		
Can produce and print document.		
Can compose a document at the keyboard.		
Has used a word processing software package to complete an assignment from another subject area.		

Recommendations: ____

____

____

Teacher's Signature ______________________

S – Satisfactory   NS – Not Satisfactory

Note: Full-size versions of all sample forms in this teacher resource manual can be found in the Appendix.

Student Tracking

In a modular program such as the computer studies program, monitoring and tracking students' progress is necessary for the success of the program. The Student Record tracking sheet below can be used effectively for this. The history portion of the form is completed by the student early in the school year and is the basis for assessment of a student's entry skill level and placement in the program. The second half of the form on the following page is used for tracking purposes. Assigned/completed modules are recorded and filed for reference later in the year or for subsequent years of the program. It is recommended that copies of this tracking form be maintained by both the teacher and the student.

Name ____

Address ____

Phone Number ____

Last School Attended ____________________ Grade Completed __________

History

Check off those modules of instruction completed in previous years.

Applications Modules

_____ Module 1 – Computer Operations
_____ Module 2 – Software Overview
_____ Module 3 – Graphics Software Applications
_____ Module 4 – Desktop Publishing: Introduction
_____ Module 5 – Desktop Publishing: Advanced

Keyboarding Modules

_____ Module 6 – Keyboarding: Introduction
_____ Module 7 – Keyboarding: Full Keyboard
_____ Module 8 – Keyboarding: Extension
_____ Module 9 – Keyboarding: Intermediate
_____ Module 10 – Keyboarding: Advanced

Productivity Modules

_____ Module 11 – Word Processing: Introduction
_____ Module 12 – Data Bases
_____ Module 13 – Spreadsheets
_____ Module 14 – Electronic Communications
_____ Module 15 – Word Processing: Extension

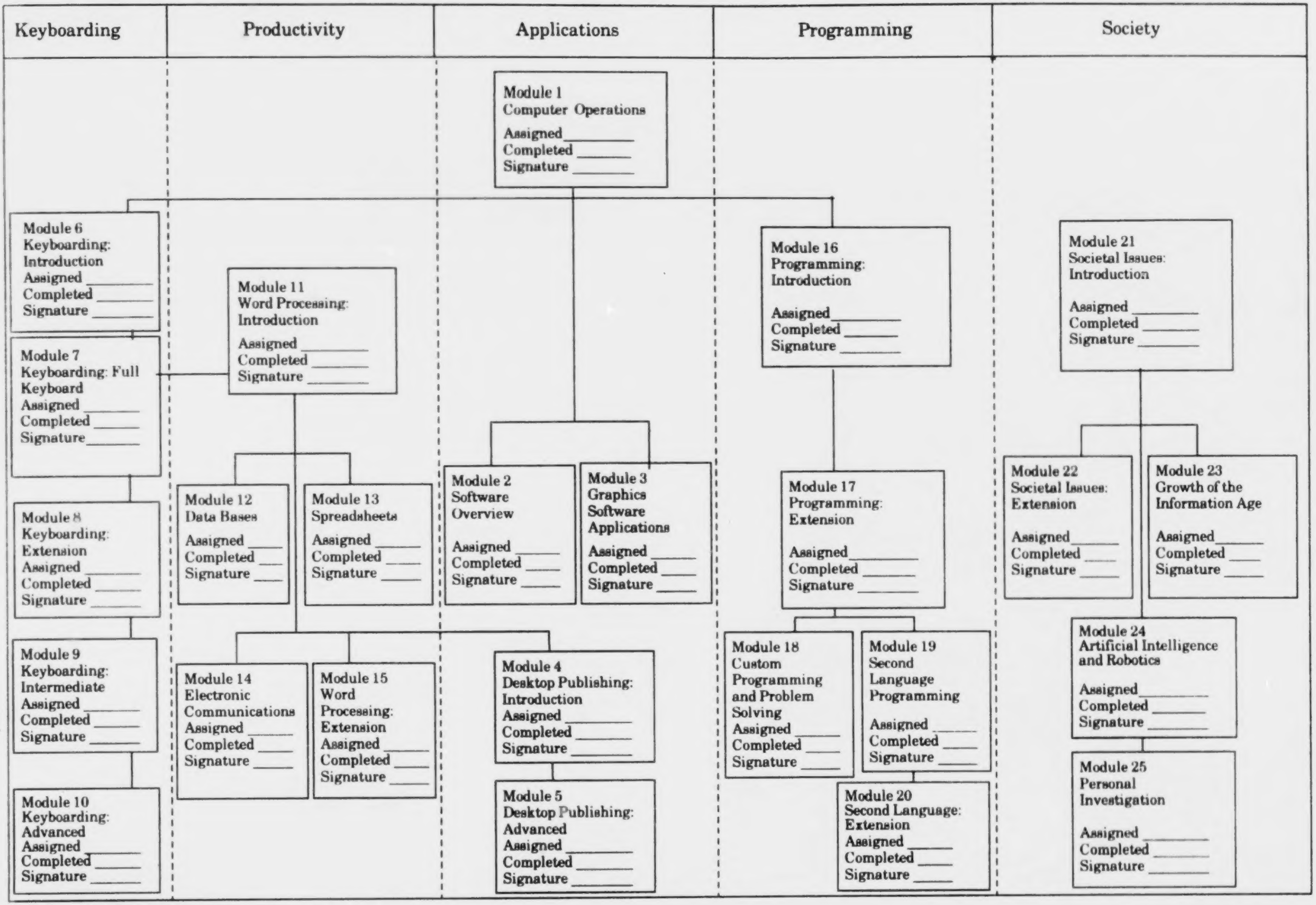
Programming Modules

_____ Module 16 – Programming: Introduction
_____ Module 17 – Programming: Extension
_____ Module 18 – Custom Programming and Problem Solving
_____ Module 19 – Second Language Programming
_____ Module 20 – Second Language: Extension

Society Modules

_____ Module 21 – Societal Issues: Introduction
_____ Module 22 – Societal Issues: Extension
_____ Module 23 – Growth of the Information Age
_____ Module 24 – Artificial Intelligence and Robotics
_____ Module 25 – Personal Investigation

MODULE COMPLETION RECORD Student Name ________________ Grade ________ Date ________



Keyboarding | Productivity | Applications | Programming | Society

Module 1
Computer Operations
Assigned ________
Completed ______
Signature _______

Module 6
Keyboarding: Introduction
Assigned ________
Completed ______
Signature _______

Module 7
Keyboarding: Full Keyboard
Assigned ______
Completed _____
Signature ______

Module 8
Keyboarding: Extension
Assigned ______
Completed ______
Signature ______

Module 9
Keyboarding: Intermediate
Assigned ______
Completed _____
Signature ______

Module 10
Keyboarding: Advanced
Assigned ______
Completed ______
Signature ______

Module 11
Word Processing: Introduction
Assigned ________
Completed ______
Signature _______

Module 12
Data Bases
Assigned ____
Completed ___
Signature ___

Module 13
Spreadsheets
Assigned _____
Completed ____
Signature ____

Module 14
Electronic Communications
Assigned _____
Completed ____
Signature _____

Module 15
Word Processing: Extension
Assigned _____
Completed ____
Signature ____

Module 2
Software Overview
Assigned _____
Completed _____
Signature _____

Module 3
Graphics Software Applications
Assigned _____
Completed _____
Signature _____

Module 4
Desktop Publishing: Introduction
Assigned ________
Completed _______
Signature _______

Module 5
Desktop Publishing: Advanced
Assigned ________
Completed _______
Signature _______

Module 16
Programming: Introduction
Assigned ________
Completed ______
Signature _______

Module 17
Programming: Extension
Assigned ________
Completed ______
Signature _______

Module 18
Custom Programming and Problem Solving
Assigned _____
Completed ____
Signature _____

Module 19
Second Language Programming
Assigned _____
Completed ____
Signature ____

Module 20
Second Language: Extension
Assigned _____
Completed ____
Signature ____

Module 21
Societal Issues: Introduction
Assigned ________
Completed _______
Signature _______

Module 22
Societal Issues: Extension
Assigned ______
Completed ____
Signature _____

Module 23
Growth of the Information Age
Assigned ______
Completed ____
Signature _____

Module 24
Artificial Intelligence and Robotics
Assigned ________
Completed _______
Signature _______

Module 25
Personal Investigation
Assigned ________
Completed _______
Signature _______

NOTE: Fill in dates for each module assigned and completed.

Organizing for Learning

The modular approach to computer studies makes it possible for students to develop at a rate consistent with their own abilities rather than trying to match the abilities and development speed of the large group. This makes it necessary for the instructional approach to adapt to more than one learning group at a time. It is not intended that the course be totally individualized, but that the flexibility be present for students to advance from the level at which they enter the course to a level consistent with the required learner expectations set out in the program of studies.

Grouping Strategies

Grouping in this context does not imply a physical arrangement of students, it is merely an administrative tool to allow many activities to be carried on in one classroom at any one time. Often students will be interacting with others in their "group"; just as often they will be working on the same topic, but independent of members of their "group."

Instructional material may be presented to students in a variety of ways. It is recommended that no one delivery method be used throughout the course— certain modules and certain classroom situations make some strategies more appropriate than others. Teachers may find the following grouping strategies helpful in some part of the computer course.

Small Group

Students may be placed into small groups according to different criteria at different times. Three to five students per learning group is the optimum number.

Note: Remember, within any of these grouping strategies, students within the group may or may not communicate with and assist each other—your teaching style dictates the activities in the classroom.

"Grouping" does not imply that students are physically arranged in a specific section of the room. It merely indicates that certain students are working on one topic and other students are working on others. In smaller schools, this would even allow students of different grades to be integrated into one room for the complementary course. Following are some grouping strategies you might find useful.

- Heterogeneous - this grouping method provides the opportunity for two or three different modules to be carried out at the same time in varying "stations." One group (or set of groups) may look at word processing software while another explores societal issues and a third group writes programs. After a specified time, students would rotate to another "station."

- Ability - grouping students of similar abilities facilitates parallel development in an area. This way no group is held back or pushed through the learning of a specific topic or module.

  Grouping students of differing abilities may facilitate the role of more advanced students as motivators and peer tutors for the group while providing students with fewer skills the opportunity to receive more personalized attention. This helps students receive the social skills necessary to collaborate effectively with others.

- Need – grouping students with similar needs—for example, to provide remedial or enrichment work in a specific area.

- Interest – grouping students with shared interest to enhance the motivation that is so critical to learning.

  This provides the opportunity for different areas of one module to be explored. For example, within the societal stream, students could be put into groups to research ways that computers are and will be used in health care, or entertainment and the arts, or police work or automobiles, etc. After their work is complete (and put on the word processor if appropriate), the various groups would report to the whole class to share information. Or, some students could write a simple program in Logo while another group attempts Pascal and yet another tries machine language—all working in the second language programming module.

- Achievement – grouping students according to their level of expertise in a given area of study.

  This could, for example, provide opportunities for students who are familiar with introductory Word Processing to work together in the Word Processing extension module.

One-to-one

In certain situations, it may be more appropriate for students to be instructed on a one-to-one basis. The distinct disadvantage for student/teacher grouping in this manner is that it decreases instructional time for others, and it tends to impede classroom management. However, there are situations where this grouping can be used to advantage. In addition, student/student grouping in a peer tutoring situation can be used very successfully.

Individual Study

Some modules and class situations might lend themselves to independent study. This can be facilitated through a worksheet approach or an individualized library research project, or simply through a read/report assignment on various topics.

Large Group Instruction

This teaching technique need not be discarded, and may be most effective when presenting curriculum content appropriate for all students. The obvious advantage is efficient use of time, and the sense of cohesiveness that students achieve in this instructional setting. The keyboarding component is a "natural" for this delivery method since so much of the success of students in this module depends on the teacher providing support and encouragement to concerted efforts of students to improve technique by practice.

Yearly Planning

The sample individual grouping plans and the yearly plan on the following pages have been developed to reflect the modular approach of the program. The sample depicts a class of students as described by the three "typical" student types (Students A, B and C) described in the Programming Flexibility section. The timetables for each of the three student groups illustrate the selection of modules, order of presentation and some grouping strategies. They also reflect the following considerations:

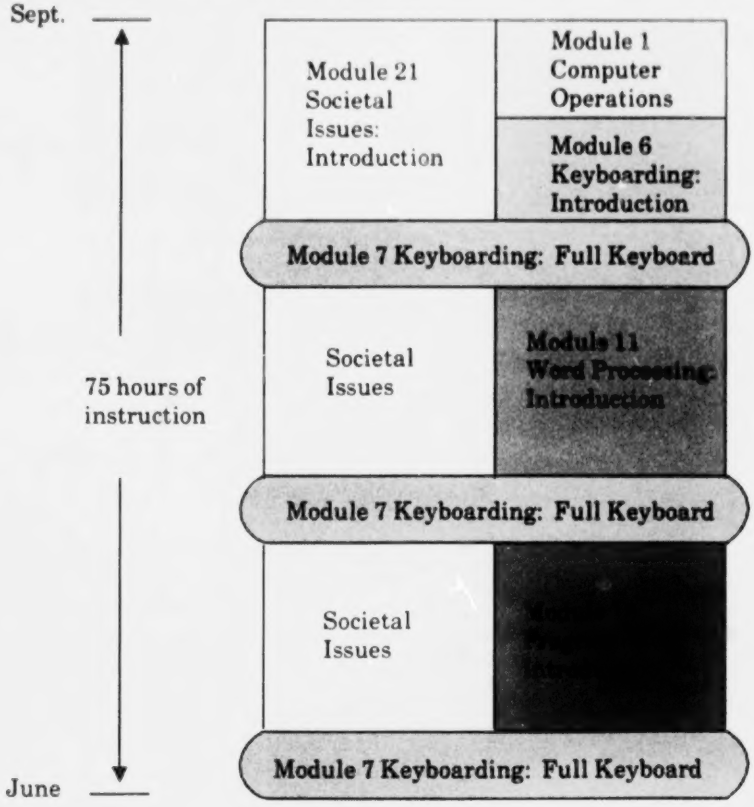
- All modules, except Module 1, Computer Operations, have been designed to be completed in 6 to 12 hours of instructional time. Module 1 has been designed to be completed in 4 to 6 hours.
- Completion of the 6 mandatory modules is intended to require 75 hours of class time with the opportunity built in for enrichment and remediation to meet the individual needs of students.
- Keyboarding is a required module for each year of a student's program. Except for the introductory module, skill building on the keyboard should occur throughout the year on a continual basis.
- It is not intended that the modules of instruction be presented in a lock-step sequence. As suggested in grouping strategies, a single method of presentation throughout the year is not recommended; variations in the grouping of students are encouraged.
- The societal theme is one for which a variety of grouping strategies can work very effectively. Organize the classes so that societal topics can be presented concurrently with other modules throughout the year on a weekly, bimonthly or monthly basis. For some topics you may chose to group the traditional lecture method with full class participation, while other topics may be covered as individualized study or in small groups.

Student Group A - consists of students who have had no previous experience with computers and would therefore be expected to complete the six mandatory modules. The sequence of module choices may vary as long as prerequisites are met.

Theme	Module Choices
Applications	Module 1: Computer Operations
Keyboarding	Module 6: Keyboarding: Introduction
Keyboarding	Module 7: Keyboarding: Full Keyboard
Productivity	Module 11: Word Processing: Introduction
Programming	Module 16: Programming: Introduction
Society	Module 21: Societal Issues: Introduction

All mandatory modules for Student Group A are included in the timetable. Each module is approximately 6 to 12 hours in length, except for Module 1, Computer Operations, which is designed to be completed in 4 to 6 hours. The module Keyboarding: Full Keyboard is shown on the timetable as three horizontal bars. Collectively they represent 6 to 12 hours of instruction time. This will allow for whole class or small group instruction at appropriate times throughout the year.

The Societal Issues Module is shown on the timetable vertically to indicate that instruction can be presented throughout the year. As will be shown on the yearly plan, this organizational strategy can accommodate a variety of student groupings across the whole class.


Sept.
75 hours of instruction
June
Module 21 Societal Issues: Introduction
Module 1 Computer Operations
Module 6 Keyboarding: Introduction
Module 7 Keyboarding: Full Keyboard
Societal Issues
Module 11 Word Processing: Introduction
Module 7 Keyboarding: Full Keyboard
Societal Issues
Module 7 Keyboarding: Full Keyboard

Student Group B – consists of students who are starting the computer studies program after demonstrating mastery of Computer Operations, Keyboarding: Introduction, and Keyboarding: Full Keyboard.

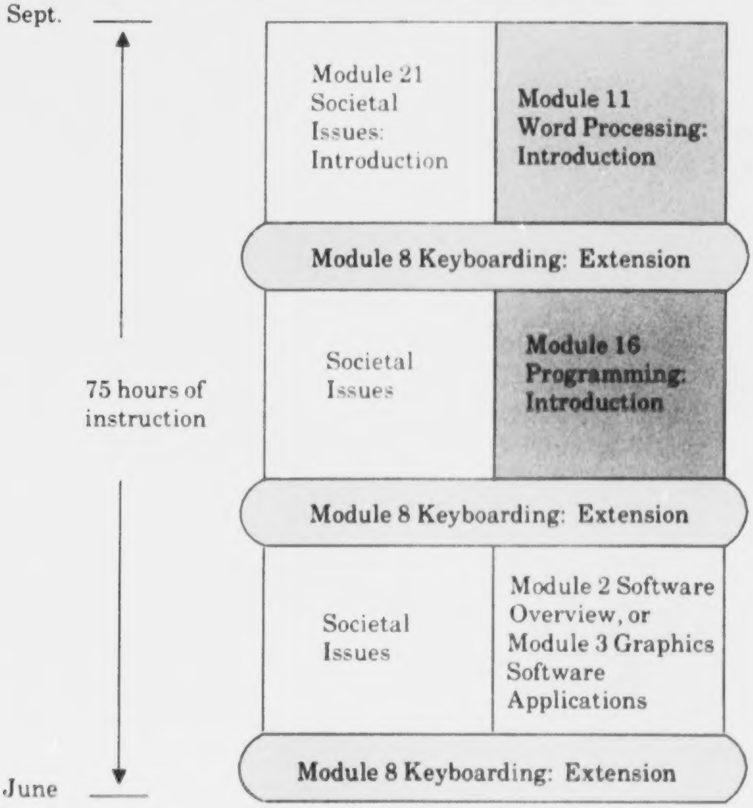
To meet mandatory requirements, the following three modules must be completed before attempting any further modules in the program.

Theme	**Module Choices**
Productivity	Module 11: Word Processing: Introduction
Programming	Module 16: Programming: Introduction
Society	Module 21: Societal Issues: Introduction

Once the mandatory modules are complete, two of the following modules must be done to meet the required minimum of one module from the keyboarding theme and a minimum of four modules from three other themes (for a minimum of five modules per year).

Theme	**Further Module Choices**
Applications	Module 2: Software Overview, or
Applications	Module 3: Graphics Software Applications
Keyboarding	Module 8: Keyboarding: Extension

Each module is approximately 6 to 12 hours in length. The timetable has been set up to reflect a student's choice of Module 2 from the Applications Theme. Like Student Group A's timetable, the Keyboarding and Societal Issues modules are organized differently to accommodate variations in student groupings, presentation of content and timing.


Sept.
75 hours of instruction
June
Module 21 Societal Issues: Introduction
Module 11 Word Processing: Introduction
Module 8 Keyboarding: Extension
Societal Issues
Module 16 Programming: Introduction
Module 8 Keyboarding: Extension
Societal Issues
Module 2 Software Overview, or Module 3 Graphics Software Applications
Module 8 Keyboarding: Extension

Student Group C – consists of students who have demonstrated proficiency in all mandatory modules of instruction and have therefore met the minimum first-year program requirements. These students can then be treated as second-year students.

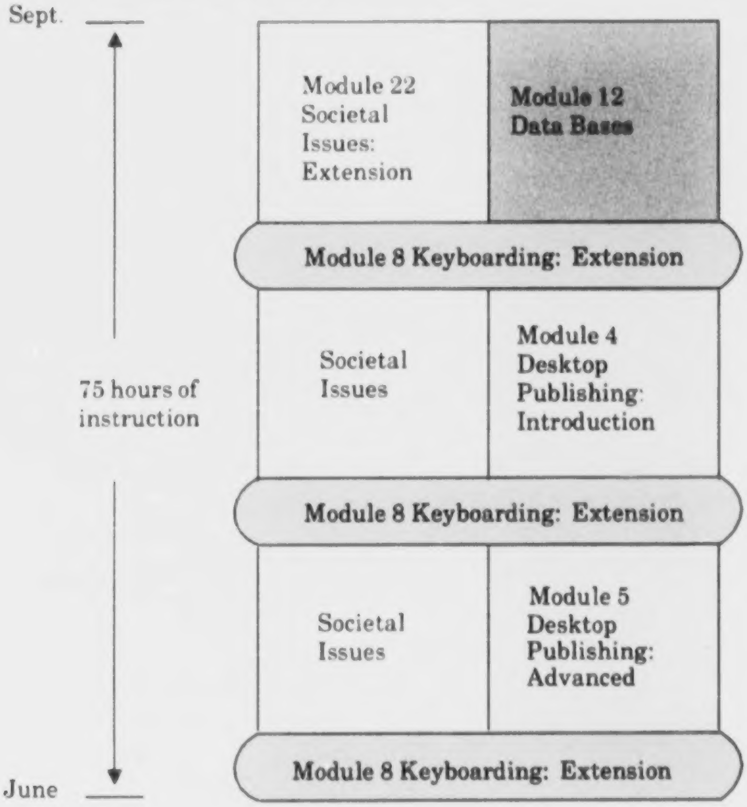
Note: During the second and third year of the program, students must take one module from the Keyboarding theme and a minimum of four modules from three other themes for a minimum of five modules per year.

This scenario demonstrates choices for a student group that has indicated a high degree of interest in desktop publishing.

Theme	**Module Choices**	
Keyboarding	Module 8:	Keyboarding: Extension
Productivity	Module 12:	Data Bases
Society	Module 22:	Societal Issues: Extension
Applications	Module 4:	Desktop Publishing: Introduction
Applications	Module 5:	Desktop Publishing: Advanced

Note: Refer to the Flow Chart of Computer Studies Modules (page 8) for clarification of prerequisites for all the examples.

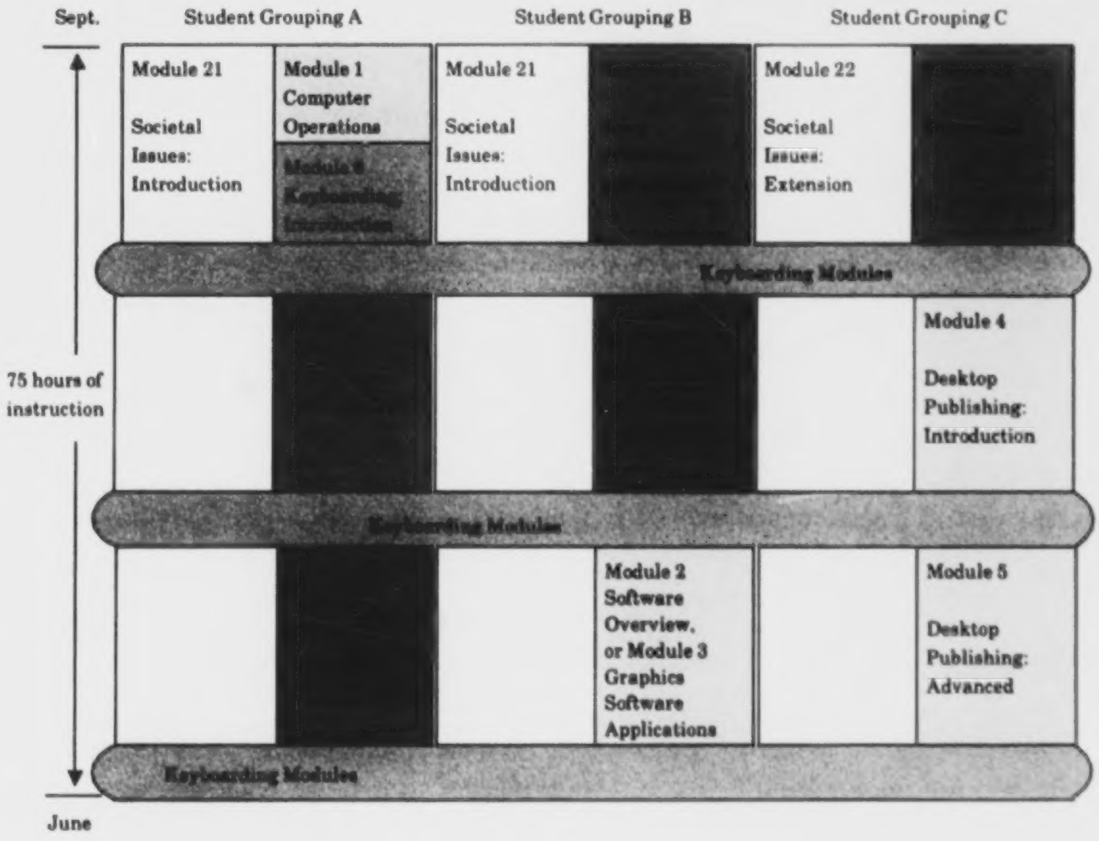
Each module is approximately 6 to 12 hours in length. The timetable has been set up to reflect an emphasis on desktop publishing modules. Like Student Group A's timetable, the Keyboarding and Societal Issues modules are organized differently to accommodate variations in student groupings, presentation of content and timing.


Sept.
Module 22 Societal Issues: Extension
Module 12 Data Bases
Module 8 Keyboarding: Extension
75 hours of instruction
Societal Issues
Module 4 Desktop Publishing: Introduction
Module 8 Keyboarding: Extension
Societal Issues
Module 5 Desktop Publishing: Advanced
Module 8 Keyboarding: Extension
June

The yearly plan below comprises the three student grouping scenarios. It illustrates how the three groups are organized so that appropriate use is made of one-to-one, small group and whole class instruction.

Notice that the Keyboarding module is shown as three horizontal bars running the full width of the timetable. This allows for whole class or small group instruction at appropriate times throughout the year.

The Societal Issues modules (shown vertically in each of the timetables) are taught throughout the year, with students organized individually, in small groups or as a class. The intent of this timetable is also to provide flexibility in timing, so that groupings and presentation of content could occur weekly, bimonthly or on a monthly basis. You may also choose to organize your class in this way to accommodate computer-centred and non-computer-centred student assignments depending on hardware constraints.


Sept.
Student Grouping A
Student Grouping B
Student Grouping C
Module 21
Societal Issues: Introduction
Module 1
Computer Operations
Module 6
Keyboarding: Introduction
Module 21
Societal Issues: Introduction
Module 22
Societal Issues: Extension
Keyboarding Modules
75 hours of instruction
Module 4
Desktop Publishing: Introduction
Keyboarding Modules
Module 2
Software Overview, or Module 3
Graphics Software Applications
Module 5
Desktop Publishing: Advanced
Keyboarding Modules
June

Elements of Effective Lesson Planning

An indicator of an effective program is evidence of lesson planning. A series of sample lessons using the lesson planning model below as a guide, can be found in the Sample Lesson Plans section. The lesson planning model below is intended to assist teachers as they develop their lesson plans. A blank version of the outline can be found in the Appendix (Handout 5).

Theme:

Module:

Learner Expectation:

Clarification of Expectation/ Description:	A brief description of the lesson activity and clarification of the learner expectation. Make reference to integration with other subject areas where applicable.
Elective Suggestions:	Alternative suggestions for remediation or enrichment in this lesson.
Teacher Preparation:	Suggestions that will enhance the lesson (e.g., presentation suggestions, displays, handouts or grouping strategies for students).
Student Preparation:	Identify prerequisite knowledge/skills student should have for this lesson.
Resources:	Specific reference to basic or support resources for this lesson to include software, hardware and print references with page numbers.
Suggested Activities:	Activities should be student-centred for the most part, in keeping with the modular approach of the program, but may also be teacher-centred. They should be detailed and reflect good lesson presentation strategies (e.g., effective teaching strategies set, active participation, closure). Include masters of sample handouts or assignment sheets where applicable. Make reference to the **integration of content with other subject areas** and other computer studies modules of instruction where applicable (e.g., social studies topics or keyboarding and word processing topics). Suggested timeline for completion.
Evaluation:	Identify evaluation strategies with sample instruments where applicable.
Teaching Tips:	Suggestions for teachers in presentation of this topic. Ideas for display, sources of information, etc.
Post-Lesson Comments:	List suggestions for the next time this lesson is used.

Daily Planning Record

The following daily planning record sheet is provided as an administrative tool to plan student activities within the modular groupings of the class. Use it to record pertinent information about the day's activities. It can also become a diary for the week, month, year and may facilitate future planning.

Week of ______________________________

Class ______________________________

Module__ Students: __________ __________ __________ __________	Notes:
Module__ Students: __________ __________ __________ __________	Notes:
Module__ Students: __________ __________ __________ __________	Notes:
Module__ Students: __________ __________ __________ __________	Notes:
Module__ Students: __________ __________ __________ __________	Notes:

Your own version of this form can be set up on a word processor file. See Handout 4 for a full-page version.

Required and Elective Components

Each module of the program has a required component and an elective component, defined as follows.

The required component encompasses the knowledge, skills and attitudes that all students are expected to acquire.

The elective component provides opportunities to adapt and enhance instruction to meet the diverse needs, abilities and interests of individual students. It provides enrichment and additional assistance to individual students as necessary.

The maximum time allotment for the elective component of the Junior High Computer Studies Program is 30 percent of the instructional time. Completion of the 6 mandatory modules is intended to require 75 hours of class time, with the opportunity built in for enrichment or remediation to meet the individual needs of students.

Suggestions for Enrichment or Remediation

The Specific Learner Expectations section of this TRM contains numerous suggestions for student activities and integration of computer studies with other subjects.

It is not intended that students complete all of the suggested activities. This flexibility in choice and number of activities can be used to modify the program for students' enrichment or remediation.

INTEGRATION IN OTHER SUBJECTS

Today, computers are used throughout day-to-day life. Directly or indirectly we use computer technology to cook, tell time, bank and shop. Computers are a great tool, but students must understand the concepts, the potential impact and the uses of technology if they are to use them to their full advantage.

Access to better educational opportunity is possible by integrating advances in technology such as computer networking, electronic communications and other new developments in distance and individual learning. The application of technology in the classroom to enhance learning will require a collective vision and cooperation among many agencies involved in the delivery of education programs.

To this end, the computer studies program promotes the integration of computers into student learning and problem solving. The program is based on two beliefs: first, all students need some minimal knowledge of computers, particularly from the point of view of the computer as a productivity tool and learning tool (learning with and through computers); second, students who wish to pursue their study in this area have the opportunity to participate in a complementary computer studies program (learning about computers).

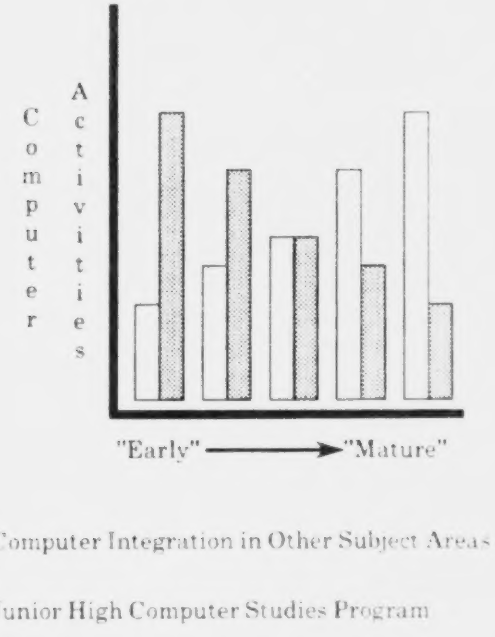
Computer technology has the potential to affect classroom practice in many ways. Computer technology can enhance what is already being taught. An example of this is the change in writing instruction as a result of the use of the word processor. It has been reported that students using word processors are composing more material with greater concern for revision and improvement of their written work. Computer technology will also alter teachers' roles. Classrooms tend to become more student-directed, with teachers serving as facilitators and coordinators of several activities. The technology will also add new practices that have not been possible in the past. Examples of this might be the use of telecommunications to research a topic or to have students in different locations interact and share information on a topic.

The role of the computer teacher in integration is that of a "bridge builder." The computer studies curriculum is designed to give students tools they can apply beyond the computer studies classroom. Subject area teachers are the ones who are most aware of the needs of their particular subject. The computer studies teacher can let the subject area teacher know what skills are being developed, and together they can develop assignments that meet objectives of both programs. In this way, students with computer skills become a "bridge" to integration. Activities that promote this integration have been identified and cross-referenced with specific learner expectations in each of the modules of the computer studies program.

Full-scale integration of the computer into a subject area, with the computer becoming a part of the everyday lesson, is not feasible without a broad base of support within the school or district. This includes the technical support needed for selecting, ordering, managing and repairing hardware and software, organizing and scheduling computer room timetables; it also requires informed staff who are able to make use of the technology.

This program will provide an opportunity for junior high students to explore computer studies in a complementary program. It has been designed as a bridge to encourage integration into other subject areas as schools move from "early" to "mature" stages of integration. Schools at an "early" stage of implementation place an emphasis on the computer studies complementary program with computers taught only as a separate subject. There is little, if any, integration of computers in core programs. Schools at a "mature" stage of implementation place a primary emphasis on the integration of the computer in core and complementary programs courses.

STAGES OF COMPUTER INTEGRATION IN OTHER SUBJECT AREAS



Full integration of the computer will have occurred in schools when the computer is used extensively in all subject areas. At this point, the computer studies program emphases will shift from learning with and through computers to a program for students who want to learn specifically about computers.

Integration in the Core Subjects

The following references to the use of computers have been taken from Alberta Education documents from all the core subject areas. These references are included here to emphasize the increasing trend towards the use of the computer in other subject areas.

LANGUAGE ARTS
(*Junior High Language Arts Program of Studies*, 1987)

Statement of Content for Writing

SKILLS (7)	SKILLS (8)	SKILLS (9)
The students should be able to:	The students should be able to:	The students should be able to:

- understand how modern technology such as computers and word processors influences the drafting, revising, proofreading, editing and publishing of written communication.
- develop increasing proficiency in the use of computer technology during all stages of the writing process.

MATHEMATICS
(*Junior High Mathematics Program of Studies*, 1988)

The Role of Calculators and Computers

The rapid growth of microtechnology has had an immense impact on mathematics education. Standard computations and manipulations of algebraic symbols, for example, are now incidental applications of hand-held calculators. Mathematics programs must recognize the pervasiveness of technology by de-emphasizing activities that are much more easily replicated by computers, calculators and, in the future, by as yet unknown technologies. Emphasis must be placed on problem solving and on understanding concepts and relationships. Technologies such as computers and calculators must be used to develop concepts, to explore relationships, to explore patterns, to organize and display data, and to eliminate tedious computations.

The *Junior High Mathematics Teacher Resource Manual* contains suggestions within each grade level giving specific suggestions for the use of the computer in mathematics.

SOCIAL STUDIES

(*Junior High Social Studies Teacher Resource Manual*, 1989)

Technology

The integration of technology in the social studies program will assist in meeting the educational needs of all students. Students must understand the concept, the potential impact and the use of technology as well as the applications of technology such as electronic communications and computer networking. The use of data bases, spreadsheets and word processing should be encouraged.

PROCESS SKILLS	GRADE LEVEL			
	6	7	8	9
Gather facts, using computers and telephone and television information networks:				
1. Operate a computer to enter and retrieve information gathered from a variety of sources.		●	●	●
2. Access information through networks, data banks and on-line sources.				☐
3. Use a word processing program to organize information.	●	●	●	●
COMMUNICATION SKILLS				
9. Develop increasing proficiency in the use of computer technology during all stages of the writing process (drafting, revising, proofreading, editing and publishing).		●	●	●

Skills on the chart are identified at three levels.

☐	Awareness Level	– The teacher uses or models the skill through teaching.
●	Instructional Level	– The skill is taught to students through planned learning experiences.
★	Independent Level	– The skill should be maintained and developed through review and application.

SCIENCE

(*Grade 7 Science Program of Studies*, 1989)

Program Rationale and Philosophy

Attention is also given to the development of information accessing and research skills and to the use of technological materials (e.g., computers and interface devices).

Note: Much effort has been devoted to providing integrational activities for many of the specific learner expectations. Please refer to the "Integrated Activities" columns on pages 36 to 90.

LEARNING RESOURCES

Learning resources fall into three categories: **Basic**, *Support* and Other.

Student learning resources include those print, non-print and electronic software materials used by teachers or students to facilitate teaching and learning.

Basic learning resources are those resources approved by Alberta Education as the most appropriate for meeting the majority of the learner expectations of the course, or substantial components of the course, as outlined in the program of studies,

AND

those productivity software programs (e.g., word processor, spreadsheets, data bases, integrated programs) approved by Alberta Education that can be used to achieve important objectives across two or more grade levels, subject areas or programs. **Basic** resources are considered materials that all students should have.

Support learning resources are those approved by Alberta Education because they make an important contribution to the attainment of one or more of the general learner expectations of the course as outlined in the program of studies. *Support* resources may be further divided into a) teacher, and b) student, where multiple copies (but not necessarily class sets) are desired.

"Other" learning resources are those identified by Alberta Education as useful for teachers in the implementation of a course or program of studies, but which have not undergone the standard review procedures of Alberta Education. Alberta Education does not accept responsibility for use of these resources with students. A disclaimer statement is used in teacher support publications wherever these resources are listed. These titles are provided as a service only, to help local jurisdictions identify potentially useful learning resources. The responsibility for evaluating these resources before selection rests with the local jurisdiction.

In this learning resources list, and throughout the TRM, **Basic** resources are printed in **bold**, *Support* resources in *italic* and Other resources in plain typeface.

Basic Learning Resources

AppleWorks, Version 3.0, Claris Corporation, 1989.
FrEdWriter, Version 4.4, San Diego County Office of Education.
LogoWriter, Secondary Version 2.0, Logo Computer Systems Inc., 1989.
Microsoft Works, Version 2.0 (IBM), 1989, Version 2.0a (Macintosh), 1988, Microsoft Corporation.
MouseWrite, Version 2.6.8c, Roger Wagner Publishing Inc., 1985-87.

Support Learning Resources (Student) All Themes

MacMillan Computer Literacy, Peter Dublin and Peter Kelman, Collier MacMillan Canada, Inc.,1986.

Microcomputers for Learners (series), ACCESS Network, 1988.

Applications Theme

Publish It!, Version 3, (Apple IIe 128K), Timeworks Inc. (MacIntosh/IBM versions under review).

The Children's Writing and Publishing Centre, Janet Joers and Deborah Stone (Apple IIe) Learning Company, 1988.

Keyboarding Theme

MECC Communikeys Apple IIe (48K), MECC Inc., 1989.

Ultra Key (Apple IIE) (Macintosh) Bytes of Learning, 1990.

Productivity Theme

Kid Mail, Brian Winge, Version 5.0, Apple IIe, Computer Using Educators.

ProTerm, Greg Schaefer, Apple IIE, Checkmate Technology, 1987.

Programming Theme

Graphics Master (Hi-Resolution Sketcher), George Millar, Alberta Teachers' Association Computer Council, 1988.

Introduction to BASIC, Gary Bitter, Addison-Wesley Publishing Company, 1989.

Master Graphics (Lo-Resolution Sketcher), George Millar, Alberta Teachers' Association Computer Council, 1986.

Society Theme

A.I.: An Experience with Artificial Intelligence, Cary Hammer, Scholastic-Tab Publications Ltd., 1987.

Dream Machine: The Visual Computer, (Videodisc), the Voyageur Company, 1988.

Dream Machine, Volume Two, Computer Dreams, (Videodisc), the Voyageur Company, 1989.

Lego Tc Logo, Simon Papert et al., (Apple IIE) Lego Systems Inc. 1987.

Support Learning Resources (Teacher) All Themes

MacMillan Computer Literacy Teacher's Edition, Peter Dublin and Peter Kelman, Collier Macmillan Canada, Inc.,1986.

Microcomputers for Learners Workshop Activity Guide (series), ACCESS Network, 1989.

Productivity Theme

Classworks-AppleWorks for the Classroom, Rick Thomas, International Council for Computers in Education (ICCE), Publications, 1988.

Programming Theme

Introduction to Programming Using LogoWriter, Sharon Burrowers Yoder, 2nd. Edition, International Council for Computers in Education (ICCE), 1990.

Introduction to BASIC Teacher's Guide, Gary Bitter (Apple IIe), Addison-Wesley Publishing Company, 1989.

Other Learning Resources

Other learning resources are listed below as well as in each of the modules within the resources column.

All Themes

Computers, Curriculum and Whole Class Instruction, Betty Collis, Wadsworth Publishing Co., 1988.

Computer Awareness (2nd ed.),Wood, South-Western Publishing Co., 1989.

The Mind Tool: Computers and Their Impact on Society, Richard L. Daughenbaugh, Western Publishing Co., 1986.

Spotlight on Computer Literacy (student text).

Spotlight on Computer Literacy (teacher text).

Understanding Computers, Grace Hopper and Mandrell, Western Publishing Co., 1987.

Using Computers in Our Society, Christopher M. Kelly and H. James Watts, South-Western Publishing Co., 1988.

Using the Computer Concepts and Applications, Wilkinson and Talsky, Prentice Hall, 1988.

Keyboarding Theme

Type to Learn, Apple IIe (48K), MS-DOS, Sunburst Communications.

Applications Theme

Desktop Publishing, Benedict Kruse, Delmar Publishers, 1989.

Instant Survey, MECC, 1989, Type to Learn, Apple IIe (48K), MS-DOS, Sunburst Communications.

Productivity Theme

AppleWorks Applications and Activities, L. Fink, et al., Addison-Wesley Publishers, 1988.

AppleWorks Integrated Applications for MicroComputers, Dean Clayton, et al., South-Western Publishing Co., 1987.

AppleWorks in Your Classroom, David Chesebrough, J. Weston Walch, 1988.

AppleWorks Resource Guide for Teachers and Parents, Susan Bandura, Editor, Claris Corporation, 1989.

Using AppleWorks in the Classroom, Joan Postma and Jennabeta Borgard, Addison-Wesley Publishers, 1987.

An Introduction to Computing Using AppleWorks, Bruce Presley and William Freitas, Lawrenceville Press, 1989.

Programming Theme

A Guide to Programming in Apple.

Apple Logo in the Classroom, MECC, 1983.

BASIC Discoveries, Malane and Johnson, Creative Publications.

LCSI Logo II, Eric Brown, et al., Logo Computer Systems Inc., 1987.

Learning Math with Logo, Green and Jaeger, Turtle Enterprises, 1982.

Learning with Apple Logo, Watt, McGraw-Hill, 1983.

Logo Discoveries, Moore, Creative Publications, 1984.

Logo in the Classroom, Torgerson, The International Council of Computers in Education, 1984.

Pascal by Presley and Corica-Lawrenceville Press, 1986.

Pacal Discoveries by Krute-Creative Publications, 1983.

Apple Pascal: A Hands-On Approach by Luehrmann and Peckham-McGraw-Hill, 1981.

Programming Exercises in Basic for Microcomputers, Cathcart and Cathcart, Gage Publishing Ltd.

Teacher, Kids and Logo, Green and Jaeger, Turtle Enterprises, 1982.

The Turtle's Sourcebook, Bearden, Martin and Muller, Reston Publishing, 1983.

Society Theme

Computers in Your Life, Canadian Daily Newspaper Publishers Association, 890 Yonge St., Suite 100, Toronto, Ontario, M4W 3P4.

Computers Society and Learning, John A. Vonk and Fritz J. Erickson, Learning Publications Inc., 1985.

Computers in Your Life, George G. Bear, J. Weston Walch Publisher, 1986.

Portraits in Silicon, Robert Slater, MIT Press, 1987.

Computer studies resources—**Basic**, *Support* and Other—are cross-referenced to the specific learner expectations (pages 36-90). Refer to the column labelled "resources." This is a suggested list only; it is not expected that jurisdictions purchase all resources.

40

SPECIFIC LEARNER EXPECTATIONS

This section of the TRM lists the Computer Studies specific learner expectations by theme and module. Identified beside each specific learner expectation are student activities, resources (**Basic**, *Support* and Other) and integrational activities. At the end of each module are teacher tips.

Specific learner expectations are those concepts, skills and attitudes that students will develop in each module for all five themes of the program. The student activities and integrated activities are suggestions to help students achieve the specific learner expectations in computer studies and other subject areas. It is not intended that students should attempt all the suggested activities. Choose and/or modify those that best meet the needs of your students and program.

Resources identified for specific learner expectations as **basic** or *support* are approved by Alberta Education. Other resources are listed in each of the modules as well and are identified only as potentially useful. The responsibility for evaluating these Other resources before selection rests with the local jurisdiction.

Note: Specific learner expectations are not necessarily to be taught sequentially. You may choose to arrange the order of presentation to suit your program.

Theme 1: Applications

The applications theme provides students with an introduction to computers, how computers operate, and an overview of computer software. Other modules in this theme provide an opportunity to use computers for desktop publishing.

MODULE 1: Computer Operations (Mandatory)

Prerequisite: None

This module is an introductory module for those students unfamiliar with the components and operation of a microcomputer system. It is intended to be completed by beginning students in four to six hours.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Exhibit confidence and interest in the use of computer technology.	Read/discuss current popular computer systems in use. Note similarities and differences. Use current media as basis for discussion on computers and the future (e.g., magazine articles, television programs, newspaper articles).	*MacMillan Computer Literacy*, pp. 386-409 Current media (see TRM section on Periodicals/Journals)	List new computer developments as reported in current media. Language Arts. Write a paragraph on "The future and computers."
2. Demonstrate how a computer system operates by: **a) using a computer tutorial disk** **b) using computer terminology (monitor, disk drive, central processing unit, keyboard, mouse, disk, load, catalogue)** **c) explaining the relationship between hardware and software** **d) using various parts of a computer system (printer, disk drives, keyboard, monitor, mouse)** **e) using a pull-down menu and/or function keys** **f) using special keys (control, escape, delete).**	Describe how a computer works, explaining input, memory, central processing unit, arithmetic unit and output. Use an appropriate computer tutorial disk and a teacher-made checklist to indicate topics covered. Using available references make a labelled sketch of computer hardware indicating relationships of input, processing, storage and output. Prepare a chart on software including such items as definition, main types and examples. Demonstrate use and relationship of computer system including disk drives, keyboard, monitor, printer, mouse. Have students practise with a sample disk. Identify and practise using special keys.	Computer tutorial disk (e.g., Apple Presents . . . Apple, Your Tour of the Apple IIgs) *MacMillan Computer Literacy*, pp. 63-76; 74-76; 84-85; 93-94; 386-409 Computer user's manual Computer tutorial disk	Make a list of computer applications in other subject areas. Use software to create a crossword puzzle to review terminology.

Learner Expectations	Student Activities	Resources	Integrated Activities
3. Demonstrate an understanding of a disk operating system such as DOS, ProDos, MS-DOS by: **a) explaining the purpose of a system master** **b) loading and cataloguing disks** **c) formatting and initializing disks** **d) recognizing the incompatibility between systems.**	Discuss the need for a disk operating system. Demonstrate the use of a system's master utilities to format a disk, create disk directories, copy a disk, delete files, copy files, etc. Use a system master disk to review the disk operating system (e.g., ProDos User's Disk - Tutor - ProDos Explanation). Define DOS, ProDos, MS-DOS. Format a personal data disk for information storage. Format a disk to operate as a startup disk with a simple directory using an appropriate disk operating system.	Computer user's manual *MacMillan Computer Literacy*, pp. 84-88 Computer user's manual Apple Computer - ProDos User's disk Use a commercially prepared software package for bulletin board posters (see Module 3)	Divide the students into groups for a bulletin board activity displaying the disk operating system rules. Format a personal disk with a directory to store information according to appropriate groups (word processing, graphics, programming, games, etc.).
4. Demonstrate understanding and use of different types of memory (RAM/ROM, ram card).	Discuss and define ROM, RAM and mass storage devices. Make a record of the types and capacities of computer memory devices available at school.	*MacMillan Computer Literacy*, pp. 71-73 Computer user's manual	
5. Demonstrate responsible behaviour in using computer technology by the proper handling of hardware and software.	Review rules, policies, procedures concerning care of hardware, care of software, student access to computers. Provide students with a copy of rules, policies and procedures.	See TRM Handout 20 for a sample of "Computer Room Rules"	Compare responsible behaviour in a computer environment to responsible behaviour in a library.

Teacher Tips:

- Use a model to teach about computer memory (RAM/ROM). See "The Computing Teacher" by Margaret L. Neiss, in Models That Teach About the Computer: The Computer's Memory, April 1989.

MODULE 2: Software Overview

Prerequisite: All Mandatory Modules

This module introduces students to a variety of commercially prepared software as a means of increasing student awareness of the scope and usefulness of microcomputers.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Use a wide range of commercially prepared software to: **a) identify the variations of software types and their main purposes (drill and practise, tutorial, simulations, problem solving) through the use of an example or sample of each** **b) understand the differences among menu-driven software, memory resident software, multiple access (return to the disk often) software, by the use of an example of each** **c) configure software for different disk drive set-ups and/or different printer set-ups (interface selection, slot identification)** **d) independently follow documentation to make "unfamiliar" software operational.**	Identify, define and give examples of software types such as drill and practise, tutorial, simulations and problem solving. Have individuals or groups use software to become familiar with all available variations. Demonstrate menu-driven software, memory resident software and multiple access software by an example of each. Use examples of menu-driven, memory resident software and multiple access software Use AppleWorks to practise printer set-up, interface selection, slot identification for one or more disk drives. Use "unfamiliar" software by following instructions from the manual provided to demonstrate ability to follow instructions.	*MacMillan Computer Literacy,* pp. 89-100; menu p.102; pulldown p. 159 **AppleWorks** Multiscribe Bank Street Writer Available commercial software packages that include complete instructional manuals MECC Software **MouseWrite**	Investigating Ideas 5 and 6 from *MacMillan Computer Literacy,* p. 99. Make a chart of available software by name and type identified for work, school or entertainment. Use software for individual tutorial help in math drill and practise, science classification. Update terminology to Module 1 list using a word processor. Review **AppleWorks** training disk for configuration skills.
2. Distinguish the appropriate use of software by: **a) analyzing given situations or tasks and be able to apply appropriate software** **b) interacting with software in order to solve a problem or deal appropriately with a given task.**	*MacMillan Computer Literacy,* Exercises: pp. 178 and 182 Use appropriate software to solve a given task or problem.	*MacMillan Computer Literacy,* pp. 174-182; Using the Computer Concepts and Applications, pp. 110-114 Dazzle Draw Multiscribe Print Shop	Use a software program to prepare a poster (e.g., Print Shop) for a student union activity. Use a software program to produce artwork (e.g., Dazzle Draw).

Learner Expectations	Student Activities	Resources	Integrated Activities
3. Explain the difference between copyright and public domain software.	*MacMillan Computer Literacy*, Exercises: p. 342, Recalling Ideas, Investigating Ideas. From reading assignment, define copyright and public domain software. List available examples. Collect newspaper, magazine articles on legal issues of computer usage. Discuss, post on a bulletin board.	*MacMillan Computer Literacy*, Chapter 16, pp. 330-347 **FrEdWriter** MECC Available commerical software	Visit the school library to compare copyright laws pertaining to other video materials.
4. Assess software based on general (e.g., ease of use, accurate content, clear directions, graphic displays, colour, sound, error free) and personal criteria.	*MacMillan Computer Literacy*, Exercises: p. 103, "Recalling Ideas," Chapter 5.	*MacMillan Computer Literacy*, pp. 101-103, Lesson 5 **FrEdWriter** MECC Available commercial software	Discuss advantages and disadvantages of available Computer Assisted Instruction software.

MODULE 3: Graphics Software Applications

Prerequisite: All Mandatory Modules

This module introduces students to a variety of commercially prepared software as a means of increasing and improving a student's personal productivity.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Demonstrate familiarity with a variety of graphics software by completing a number of assignments that make use of the specific applications of individual software packages (signs, invitations, certificates, draw features).	Use available software demonstration programs (e.g., Print Shop). Use software to produce a sample (e.g., sign, border, artwork).	Available software resources Multiscribe Print Shop	Make signs, announcements, title pages for other subject areas, school and personal needs.
2. Use appropriate graphics software to solve a problem or deal appropriately with a given task.	Use graphics software to produce a representational picture (a graphic picture of a specific topic). Use graphics software to produce an analogical picture (i.e., one or more concrete objects that share an important attribute). Use graphics software to produce an abstract picture (charts, graphs, etc.).	Multiscribe MECC, Instant Survey Dazzle Draw	Create a pictograph on a social studies topic comparing populations, land areas, poll analysis, etc. Conduct a school survey, interpret results using graphics software.
3. Interpret potential benefits arising from the use of graphics software.	Use graphics software to produce a greeting card. Use graphics software to produce a letterhead. Search through magazines, computer literature, computer catalogues for examples of computer graphics. Make a classroom collage. *MacMillan Computer Literacy*, Exercises: p. 182, Extending Ideas	Computer catalogues Computer magazines Newspapers *MacMillan Computer Literacy*, pp. 174-182 Print Shop	Create a variety of borders for later use in other school assignments. Trade designs with other students.

Learner Expectations	Student Activities	Resources	Integrated Activities
4. Use manuals to learn the operation of graphics software and to correct minor problems that may arise.	Use graphics software manuals to learn set-up of printer, data disk, etc. Use graphics software manual to modify existing graphics (e.g., Print Shop).	Print Shop Multiscribe	
5. Use appropriate graphics software to complete assignments in other subject areas.	Create a Rebus in another subject area. Make a title page for another subject area. Make a set of notebook dividers.	Multiscribe	Create a Rebus for a social studies event.
6. Use appropriate graphics software to produce useful items for the school (signs or advertisements).	Plan and produce a design (e.g., memo pad, letterhead, weekly schedule) for reproduction and binding in Industrial Education. Plan and produce signs for a specific school function (e.g., open house, science fair, computer olympics, social event, sports event) using available software.	Graphics software available	Plan a master stencil that could be reproduced in industrial education.
7. Assess graphics software based on general (e.g., ease of use, clear directions, graphic displays, colour, error free) and personal criteria.	Conduct a class discussion to assess graphics software based on students' personal experiences. Record responses using a set of comparative criteria. *MacMillan Computer Literacy*, Exercise: pp. 101-103, Evaluation	*MacMillan Computer Literacy*, pp. 101-103	

MODULE 4: Desktop Publishing – Introduction

Prerequisite: All Mandatory Modules

This module introduces students to the use of a desktop publishing program that will allow students to layout and design graphics and text in a short document.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Use appropriate desktop publishing vocabulary (scroll bars, import graphics, place text, snap to guides, clip art, text area, graphic area, header, footer).	Define, discuss desktop publishing. Explain how desktop publishing is an interactive program. Compare similarities and differences of desktop publishing and word processing.	*Publish It! User's Manual* **AppleWorks** *MacMillan Computer Literacy*, pp. 89-90; 194 **AppleWorks Reference Manual,** pp. 6-11 *The Children's Writing and Publishing Centre* **Microsoft Works**	Prepare bulletin board samples of desktop publishing applications. Use a data base program to list various desktop publishing applications under such fields as education, business, social. Use a word processor to write a description of the features of a desktop publishing program.
2. Describe standard rules of design and layout (proportion, balance, rhythm, unity, contrast).	Compile and update desktop publishing terms and definitions throughout the module.	**AppleWorks** Crossword Magic *Publish It! User's Manual* *The Children's Writing and Publishing Centre*	Use **AppleWorks** to compile and update vocabulary terms and definitions. Create a crossword puzzle based on desktop publishing terms and definitions.
3. Use a desktop publishing software package to: **a) design and lay out a one-page document with two or more columns per page** **b) understand and demonstrate necessary steps to place text and import graphics** **c) change font and sizes.**	Have students read and summarize standard rules of design and layout. Discuss a bulletin board display of samples of products that use standard rules of design and layout.	*Publish It! User's Manual* Newspapers Computer catalogues Computer magazines Magazines *The Children's Writing and Publishing Centre*	Collect magazines, newspaper items that illustrate each of the standard rules of design and layout.

Learner Expectations	Student Activities	Resources	Integrated Activities
4. Use pre-designed templates to create a newsletter, brochure, invitation, résumé or personalized stationery (where software permits).	Use a tutorial program (*Publish It!*) to design, layout and print a one-page newsletter with two columns.	*Publish It!* *The Children's Writing and Publishing Centre*	
5. Describe how this technology is used in the world of business.	Produce sample documents to gain a better understanding of the design and layout principles.	*Publish It!* *The Children's Writing and Publishing Centre*	
6. Identify the differences between desktop publishing and word processing.	Using steps to desktop publishing, produce one-page documents to complete a school assignment.	*Publish It!* *The Children's Writing and Publishing Centre*	Produce a letter for a language arts assignment. Produce a personal resume for a job application. Produce a one-page newsletter for your school.
7. Demonstrate elementary principles of graphic layout and design by producing a one-page document to complete assignments in another subject area or for the school.		*Publish It!* *The Children's Writing and Publishing Centre*	

Teacher Tips

- For desktop publishing (DTP) a first document, use a prepared template. The demonstration disk (*Publish It!*) contains good examples.
- Keep DTP documents simple. It is suggested that students make a pencil and paper sketch of the proposed document. Plan title locations, columns, graphics and graphic areas.
- Consider all alternatives for image generation in DTP; sometimes cut and paste are best accomplished by a copy machine to reduce or enlarge and scissors and glue to mount a graphic.

MODULE 5: Desktop Publishing – Advanced

Prerequisite: Module 4: Desktop Publishing – Introduction

This module expands students' use of a desktop publishing program so they can produce a multi-page document.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Apply advanced techniques of desktop publishing by: **a) designing a multi-page document with two or more columns per page** **b) changing fonts, sizes, styles and alignment of text** **c) using draw features to enhance clip art graphics or text areas** **d) using cut, copy and paste features to manipulate graphics and text** **e) using additional features of specific desktop publishing packages (kerning, leading, flow text, thesaurus, spelling dictionary).**	Review five steps of desktop publishing. Design multi-page documents demonstrating ability to use advanced techniques such as: two or more columns, changes in fonts, sizes, styles, use of draw features to enhance clip art use of cut, copy and paste features, other advanced techniques (kerning, leading, flow text), use of spelling dictionary, thesaurus.	*Publish It! User's Manual* **AppleWorks** Multiscribe Dazzle Draw Print Shop MousePaint Beagle Graphics files **Microsoft Works** **MouseWrite**	Discuss the value of the writing process to successful desktop publishing. Use previously prepared **AppleWorks** material as imported text. Publish a computer club newsletter. Produce a school newsletter.
2. Assess desktop publishing software and the multi-page document based on general (e.g., ease of use, screen displays, technical design, useful features) and personal criteria.	Evaluate desktop publishing software using general and personal criteria.	Computer magazine review articles (examples) "Step by Step Publish It" InCider February 1989, pp. 36-42 "Timeworks Publish It" Desktop Publishing and Office Automation, p. 52 Newspaper reports Student work	Make a bulletin board display of student produced multi-page assignments. Have students compete in a selected multi-page area, judged by professional design and layout artists in the community, teachers, parents.
3. Investigate an area of individual interest from another subject area(s) through independent planning, teacher-assisted planning or selecting a topic from teacher-prepared options to produce a multi-page document.	Produce a multi-page document through independent planning, teacher-assisted planning, selection from teacher-prepared options.		

Theme 2: Keyboarding

Keyboarding is the process of entering (keying and inputting) data into the computer through the use of a keyboard. This theme develops students' keyboarding skills so that personal comfort and keyboarding productivity is enhanced when using computers.

Module 6: Keyboarding – Introduction (Mandatory)

Prerequisite: Module 1: Computer Operations

This module introduces students to correct touch-typing techniques.

Learner Expectations	Student Activities	Resources
1. **Develop and demonstrate correct technique:** a) **posture (hand, arm, body)** b) **fingering** c) **stroking.**	Students adjust work station to individual needs: i) clear desk of books, jackets, etc. ii) adjust chair height iii) place keyboard at edge of desk iv) position instructional materials. Students at own station model the teacher demo of correct fingering, posture and stroking technique by: i) sitting ii) feet flat on the floor iii) eyes on copy/screen iv) release elbows v) level wrists vi) motionless arms vii) curved fingers.	TRM, Posture **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn Student Text
2. **Locate and properly use the alphabetic keys, space bar, shift keys and return key.**	Refer to sample lesson plan for this module to locate and properly use new keys. Follow the procedure presented in the recommended resources to learn correct fingering. Follow overhead transparency/teacher demo of correct fingering, reaches, tapping stroke for keyboarding.	TRM, Sample Lesson Type to Learn (appropriate lessons) **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*

Learner Expectations	Student Activities	Resources
3. **Develop touch-typing skills.**	Regular drills as directed by the teacher to develop good technique with regular, flowing rhythm (teacher monitors students' work).	TRM, Daily Lesson Plan Type to Learn (appropriate lessons) **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*
4. **Develop the ability to recognize typographical errors.**	Students keep a notebook on what is an error, common proofreading marks and their meaning. Have students take time to read all drill work on screen to recognize and identify errors or commit copy to print, proofread and circle errors.	TRM, Keyboarding Sample Lesson Plans 1 space after comma, period following abbreviation, or semi-colon. 2 spaces after colon, or period, question mark, exclamation mark.

Module 7: Keyboarding – Full Keyboard (Mandatory)

Prerequisite: Module 6: Keyboarding – Introduction

This module continues the skill development of touch-typing, with emphasis on increased stroking and accuracy rates.

Learner Expectations	Student Activities	Resources
1. Continue to develop and demonstrate correct technique: **a) posture (hand, arm, body)** **b) fingering** **c) stroking.**	Students adjust work station to individual needs: i) clear desk of books, jackets, etc. ii) adjust chair height iii) place keyboard at edge of desk iv) position instructional materials. Students at own station model the teacher demo of correct fingering, posture and stroking technique by: i) sitting ii) feet flat on the floor iii) eyes on copy/screen iv) release elbows v) level wrists vi) motionless arms vii) curved fingers.	TRM, Posture **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn Student Text
2. Locate and properly use all alphabetic keys, numeric keys, space bar, shift keys, return key and other necessary function keys.	Refer to sample lesson for Module 6 to locate and properly use new keys. Follow the procedure presented in the recommended resources to learn correct fingering. Follow overhead transparency/teacher demo of correct fingering, reaches tapping stroke for keyboarding.	TRM, Sample Lesson Plan **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn (appropriate lessons)
3. Continue developing touch-typing skills.	Regular drills as directed by the teacher to develop good technique with regular, flowing rhythm (teacher monitors students' work).	TRM, Daily Lesson Plan **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn (appropriate lessons)

Learner Expectations	Student Activities	Resources
4. Continue to develop the ability to recognize and mark typographical errors.	Students keep a notebook on what is an error, common proofreading marks and their meaning. Have students take time to read all drill work on screen to recognize and identify errors or commit copy to print, proofread and circle errors.	TRM
5. Use correct spacing after punctuation.	Teacher explains rules and displays examples. Students keep a record of punctuation rules in a binder to understand and use correct punctuation.	1 space after comma, period following abbreviation, or semi-colon. 2 spaces after colon, or period, question mark, exclamation mark.
6. Calculate words-a-minute (w.a.m.) on straight copy for a one minute timing on: **a) personal handwriting** **b) keyboarding.**	Work through steps to calculate personal handwriting speed/keyboarding speed using procedure outlined in keyboarding instructional material "Speed/Accuracy." Keep notebook of steps to follow when calculating w.a.m.	TRM
7. Complete a one minute timing with keyboarding speed equal to personal handwriting speed.	Have students complete a selection of one-minute timings using procedure as outlined in keyboarding instructional material, speed/accuracy.	Typing textbooks are a good source of drill copy

MODULE 8: Keyboarding – Extension

Prerequisite: All Mandatory Modules

This module continues the skill development of touch-typing, with emphasis on the use of alphabetic and numeric keys, with increased stroking and accuracy rates.

Learner Expectations	**Student Activities**	**Resources**
1. **Continue to develop and demonstrate correct technique:** a) **posture (hand, arm, body)** b) **fingering** c) **stroking.**	Students adjust work station to individual needs: i) clear desk of books, jackets, etc. ii) adjust chair height iii) place keyboard at edge of desk iv) position instructional materials. Students at own station model the teacher demo of correct fingering, posture and stroking technique by: i) sitting ii) feet flat on the floor iii) eyes on copy/screen iv) release elbows v) level wrists vi) motionless arms vii) curved fingers.	TRM, Posture **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn Student Text
2. **Locate and properly use all alphabetic keys, numeric keys, space bar, shift keys, return key and other necessary function keys.**	Refer to sample lesson plan for Module 6 to locate and properly use new keys. Follow the procedure presented in the recommended resources to learn correct fingering.	TRM, Sample Lesson Type to Learn (appropriate lessons) **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*
3. **Locate and properly use special character keys ($,%,&).**	Follow overhead transparency/teacher demo of correct fingering, reaches and tapping stroke for students.	TRM, Daily Lesson Plan Type to Learn (appropriate lessons) **AppleWorks, MouseWrite, LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*

Learner Expectations	Student Activities	Resources
4. Continue developing touch-typing skills, using both alphabetic and numeric keys.	Regular drills as directed by the teacher to develop good technique with regular, flowing rhythm (teacher monitors students' work).	TRM, Keyboarding Sample Lesson Plan
5. Continue to develop the ability to recognize and mark typographical errors.	Students keep a notebook on what is an error, common proofreading marks and their meaning.	
6. Use correct spacing after punctuation.	Teacher explains rules and displays examples. Students keep a record of punctuation rules in a binder to understand and use correct punctuation.	TRM, Keyboarding Sample Lesson Plan 1 space after comma, period following abbreviation, or semi-colon. 2 spaces after colon, or period, question mark, exclamation mark.
7. Calculate words-a-minute (w.a.m.) on straight copy.	Work through steps to calculate w.a.m. Keep notebook of steps to follow when calculating w.a.m.	Typing textbooks are a good source of drill copy.
8. Complete a one minute timing with keyboarding speed equal to or greater than personal handwriting speed.	Have students complete a timing of the appropriate length of time (see specific learner expectation) using procedure as outlined in keyboarding sample lesson plan (see Speed/Accuracy).	

MODULE 9: Keyboarding – Intermediate

Prerequisite: Module 8: Keyboarding – Extension

This module continues the skill development of touch-typing, with emphasis on the use of the full keyboard and increased stroking and accuracy rates.

Learner Expectations	Student Activities	Resources
1. Continue to develop and demonstrate correct technique: **a) posture (hand, arm, body)** **b) fingering** **c) stroking.**	Students adjust work station to individual needs: i) clear desk of books, jackets, etc. ii) adjust chair height iii) place keyboard at edge of desk iv) position instructional materials. Students at own station model the teacher demo of correct fingering, posture and stroking technique by: i) sitting ii) feet flat on the floor iii) eyes on copy/screen iv) release elbows v) level wrists vi) motionless arms vii) curved fingers.	TRM, Posture **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn Student Text
2. Locate and properly use all alphabetic keys, numeric keys, space bar, shift keys, return key and other necessary function keys.	Refer to sample lesson plan for Module 6 to locate and properly use new keys. Maintain correct fingering while practising. Following overhead transparency, teacher demonstrates correct fingering, reaches and tapping strokes.	TRM, Sample Lesson Plan Type to Learn (appropriate lessons) **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*
3. Locate and use special character keys ($,%,&), as required.	Regular drills as directed by the teacher to develop good technique with regular, flowing rhythm (teacher monitors students' work).	Type to Learn (appropriate lessons) **AppleWorks, MouseWrite, LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys*

Learner Expectations	Student Activities	Resources
4. Continue to develop touch-typing skills, using both alphabetic and numeric keys.	Students keep a notebook on what is an error, common proofreading marks and their meaning. Have students take time to read all drill work on screen to recognize and identify errors or commit copy to print, proofread and circle errors.	TRM
5. Continue to develop the ability to recognize and mark typographical errors.	Teacher explains rules and displays examples. Students keep a record of punctuation rules in a binder to understand and use correct punctuation.	
6. Use correct spacing after punctuation.	Work through steps to calculate w.a.m. Keep notebook of steps to follow when calculating w.a.m.	TRM, Keyboarding Sample Lesson Plan 1 space after comma, period following abbreviation, or semicolon. 2 spaces after colon, or period, question mark, exclamation mark.
7. Calculate words-a-minute (w.a.m.) on straight copy.	Have students complete a timing of the appropriate length of time (see specific learner expectation) using procedure outlined in keyboarding sample lesson plan (see Speed/Accuracy).	Typing textbooks are a good source of drill copy.
8. Complete a two minute timing with keyboarding speed equal to or greater than personal handwriting speed.		

MODULE 10: Keyboarding – Advanced

Prerequisite: Module 9: Keyboarding – Intermediate

This module continues the skill development of touch-typing, with emphasis on the use of the full keyboard and increased stroking and accuracy rates.

Learner Expectations	Student Activities	Resources
1. **Continue to develop and demonstrate correct technique:** a) **posture (hand, arm, body)** b) **fingering** c) **stroking.**	Students adjust work station to individual needs: i) clear desk of books, jackets, etc. ii) adjust chair height iii) place keyboard at edge of desk iv) position instructional materials. Students at own station model the teacher demo of correct fingering, posture and stroking technique by: i) sitting ii) feet flat on the floor iii) eyes on copy/screen iv) release elbows v) level wrists vi) motionless arms vii) curved fingers.	TRM, Posture **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn Student Text
2. **Locate and properly use all alphabetic keys, numeric keys, space bar, shift keys, return key and other necessary function keys.**	Refer to sample lesson plan for Module 6 to locate and properly use new keys. Maintain correct fingering while practising.	TRM, Sample Lesson Plan **AppleWorks** **MouseWrite** **LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn (appropriate lessons)
3. **Locate and use special character keys ($,%,&), as required.**	Regular drills as directed by the teacher to develop good technique with regular, flowing rhythm (teacher monitors students' work).	TRM, Daily Lesson Plan **AppleWorks, MouseWrite, LogoWriter Secondary** **Microsoft Works** **FrEdWriter** *Ultra Key* *Communikeys* Type to Learn (appropriate lessons)

Learner Expectations	**Student Activities**	**Resources**
4. Continue to develop touch-typing skills, using both alphabetic and numeric keys.	Following overhead transparency, teacher demonstrates correct fingering, reaches and tapping strokes.	
5. Continue to develop the ability to recognize and mark typographical errors.	Students keep a notebook on what is an error, common proofreading marks and their meaning. Have students take time to read all drill work on screen to recognize and identify errors or commit copy to print, proofread and circle errors.	
6. Use correct spacing after punctuation.	Teacher explains rules and displays examples. Students keep a record of punctuation rules in a binder to understand and use correct punctuation.	TRM 1 space after comma, period following abbreviation, or semi-colon. 2 spaces after colon, or period, question mark, exclamation mark.
7. Calculate words-a-minute (w.a.m.) on straight copy.	Work through steps to calculate w.a.m. Keep notebook of steps to follow when calculating w.a.m.	TRM
8. Complete a three minute timing with keyboarding speed equal to or greater than twice the personal handwriting speed.	Have students complete a timing of the appropriate length of time (see specific learner expectation) using procedure outlined in keyboarding sample lesson plan (Speed/Accuracy).	

Theme 3: Productivity

Computers are considered to be a powerful aid to mental activities and the dissemination of the results of these mental activities. This theme introduces the student to the effective use of the productivity tools of word processing, data bases, spreadsheets, graphics and electro-communications in other subject areas.

Module 11: Word Processing – Introduction (Mandatory)

Prerequisite: Module 7: Keyboarding – Full Keyboard

This module introduces students to the operation of word processing software.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **Demonstrate effective use of word processing in the stages of the writing process.**	Identify the main points involved in the writing process. *MacMillan Computer Literacy*, pp. 116-126; Lesson reviews Q. 1-4, p. 119, Q. 1-4, p. 122; Q. 1-4, p. 126. Use the word processor to complete the various stages of the writing process. Lesson reviews Q. 7, p. 119, Q. 7, p. 122; Q. 7, p. 126.	*MacMillan Computer Literacy*, Chapter 6 **AppleWorks** **MouseWrite** Multiscribe The Writing Process Using the Word Processor **FrEdWriter** **LogoWriter Secondary** **Microsoft Works**	All subject areas. Use a word processor to prewrite, write and postwrite a paragraph on a topic assigned by a core teacher. Use a word processor to prewrite, write, and revise a paragraph on the ethics of copying software (Societal Theme).
2. **Use word processing vocabulary (file, document, word wrap, cursor, scrolling, screen display).**	Define and discuss various vocabulary terms. Lesson review. *MacMillan Computer Literacy*, p. 115, Lesson review.	*MacMillan Computer Literacy*, Chapter 6	
3. **Recognize the basic concepts of word processing.**	Identify the purpose of a word processor, and the ways in which it can help them with their writing skills. *MacMillan Computer Literacy*, p. 111.	*MacMillan Computer Literacy*, Chapter 6	
4. **Explain the advantages of a word processor (on-screen editing, speed).**	Compare word processors with typewriters and pen and paper. *MacMillan Computer Literacy*, p. 135, Chapter Review Activity 1; Lesson review Q. 7, p. 115.	*MacMillan Computer Literacy*, Chapter 6	
5. **Describe the differences between a stand-alone word processor computer and a computer with a word processing software package.**	Compare word processing software with stand alone word processors. Examples: costs, dedicated vs. non-dedicated hardware, program in ROM vs. program in RAM, versatility.		

Learner Expectations	**Student Activities**	**Resources**	**Integrated Activities**
6. **Understand and demonstrate the steps necessary to use the basic functions of a word processing package (create, store, retrieve, edit, print, list files, move/copy text, search/replace text).**	Use the word processor to complete the student activity "oops". *ClassWorks* Activity 1.1, 1.2, 2.1. Use the word processor to demonstrate basic word processing features. *ClassWorks* Activity 2.2.	**AppleWorks** *ClassWorks: AppleWorks for the Classroom*, Lesson 1 and 2 *ClassWorks* Student Data Disk **FrEdWriter** **Microsoft Works** **LogoWriter Secondary**	
7. **Output documents to the screen and printer.**	Ongoing demonstration of proper keyboarding techniques as learned in Modules 6 and 7.		
8. **Apply keyboarding skills.**	Students proofread all their word processing documents for spelling and punctuation errors before printing.	**AppleWorks** **MouseWrite** Multiscribe **FrEdWriter** **Microsoft Works** **LogoWriter Secondary**	All subject areas. Students check assignments done for other subject areas for errors before printing out.
9. **Complete an assignment in another subject area, using a word processing software program.**	Use the word processor to produce an assignment from a core or elective subject area. Examples: daily math assignment, social studies questions, science lab writeup, language arts writing assignment, list of supplies needed for a home economics or industrial arts project.	**AppleWorks** **MouseWrite** Multiscribe **FrEdWriter** **Microsoft Works** **LogoWriter Secondary**	Students use word processing software to complete subject area assignments. Science: Safety rules for a lab. Language Arts: A chart outlining different styles of poetry. Math: A table of commonly used math rules or equations.

Teacher Tips:

- Several of the assignments need some lead time to allow the students to gather information ahead of time.
- *ClassWorks* materials should be read as part of your planning. Although the material is complete, teachers may wish to reorganize parts of the lessons to make the activities more student-directed or to better suit their own teaching styles.
- Although word processing lends itself to creative "choose your own topic" assignments, students still need and want limits set. Make sure you have a list of suggested topics for them to write on and set minimums for assignment lengths so that the students may reap maximum benefits from the word processing concepts they have learned.

Module 12: Data Bases **Prerequisite: All Mandatory Modules**

This module introduces students to the electronic filing of data, using a data base software program.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **Use the vocabulary of data base construction (category, field, record, file, search rules, arranging data, layout, single record, multiple record, hard copy).**	Define and explain with a labeled diagram, the relationships between: category, field, record and file. *MacMillan Computer Literacy,* Lesson review p. 141, Q. 1-4.	*MacMillan Computer Literacy,* Chapter 7	Use a library card catalogue.
2. **Recognize the basic concepts of a physical data base, as opposed to an electronic data base (telephone or postal code directories, automotive parts book).**	Compare the similarities and differences between an electronic data base and other common data bases (phone books, directories, catalogues, etc.). *MacMillan Computer Literacy,* Lesson review p. 141, Q. 5.	*MacMillan Computer Literacy,* Chapter 7	Use a library card catalogue.
3. **Explain the advantages of an electronic data base (speed, consistency, adaptability, accessibility, and variability).**	List the advantages of electronic data bases. Use both on-line data bases and data base management systems as basis for discussion. Lesson review p. 141, Q. 6.	*MacMillan Computer Literacy,* Chapter 7	
4. **Identify primary features of data base software (structuring of data base, entering data, storing data, arranging data, searching and retrieving data).**	Using the concepts of files, records and categories, create a simple data base. *ClassWorks,* Activity 4.1. Using the simple data base, identify and demonstrate the use of sorting, arranging and select features of the program. *ClassWorks*, Activities 4.2, 4.3. Develop selection skills by finding and arranging specific information in a prepared data base file. *ClassWorks*, Activity 5.1.	**AppleWorks** *ClassWorks,* Lesson 4, Lesson 5 **Microsoft Works**	
5. **Create report files and printouts to printer or display on screen, using a sort procedure.**	Create a data base report table according to given specifications. *ClassWorks*, Activity 7.2. Print the report to the screen. *ClassWorks*, Activity 7.2. Edit the report as needed.	**AppleWorks** *ClassWorks,* Lesson 7 **Microsoft Works**	Library search.
6. **Produce a hard copy of data report using single and/or multiple record layouts.**	Print a hard copy of a data report(s) saved in *ClassWorks*, Activity 7.2.	**AppleWorks** *ClassWorks,* Lesson 7 **Microsoft Works**	

Learner Expectations	Student Activities	Resources	Integrated Activities
7. **Develop understanding of the wide variety of applications for data base information.**	Identify various uses in the home, at school and business for data base files. Examples: customer addresses and purchases, stock for a store, home inventories.	*MacMillan Computer Literacy*, Chapter 7	List ways a data base management system can be applied to various subject areas. Physical Education: Intramural teams, set-up and record keeping. Social Studies: Information on Prime Ministers.
8. **Assess data base software based on general (e.g., ease of use, clear directions, graphic displays, useful features) and personal criteria.**	Outline personal assessments of the data base software according to criteria found in *MacMillan Computer Literacy*, Chapter 5, pp. 101-103.	*MacMillan Computer Literacy*, Chapter 5	
9. **Integrate data base and word processing files to produce a document (where software permits).**	Use prepared files and the clipboard to integrate a data base file with a word processing file. Example: Summarize your findings about the Olympics in a word processing file and support your conclusions with information from a data base report. *ClassWorks*, Activity 11.3.	**AppleWorks** *ClassWorks*, Lesson 11 **Microsoft Works**	Science: Summarize the findings from a pond study data base and use the word processor to list these findings. Use the clipboard to integrate reports from the data base into the document to support the findings.
10. **Develop skills of data input through appropriate review and practise of keyboarding skills.**	Ongoing use of proper keyboarding techniques as learned in Modules 6 and 7.	See Modules 6 and 7 of this TRM.	
11. **Create a new data base designed to provide solutions to specific applications in another subject area.**	Create a data base by following a series of procedures (identify the problem, identify specific information, research, etc.) to find a solution for a specific need. Examples: Identification of rocks and minerals, comparing provinces or nations, gathering information for the comparison of the characteristics of living things. *ClassWorks*, Lesson 6.	**AppleWorks** *ClassWorks*, Lesson 6 Dataquest Composer (MECC): Data disks: "North American Mammals" "World Community" **Microsoft Works**	Social Studies: Create a data base file that could be used by a travel agent. Categories must reflect the types of information that would be useful to a tourist looking for a specific type of destination (climate, currency, type of government, language, sights, recreation, etc.). Science: Create a data base file to gather information on pond organisms. Use the information to draw inferences and conclusions about the organisms relationships to each other. Examples: structures, functions, adaptations.

Teacher Tips:

- If the teacher is not familiar with using a data base, it is highly recommended that they work through the activities in order to anticipate problems.
- Many excellent lessons on using data base applications in subject areas are found in the publication "The Computing Teacher".
- Several copies of the Student Data Disk will greatly speed up the loading of files from *ClassWorks*.

MODULE 13: Spreadsheets

Prerequisite: All Mandatory Modules

This module introduces students to the electronic ledger sheet, using a spreadsheet software program.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **Use the vocabulary of spreadsheet construction (cells, rows, columns, coordinates, categories, labels, values, blocks, formulas, functions, windows).**	Identify the various parts of a spreadsheet. Define terms used in the development of a spreadsheet file. *MacMillan Computer Literacy*, Lesson review p. 160.	*MacMillan Computer Literacy*, Chapter 8	
2. **Recognize the basic concepts of a spreadsheet in working with numbers in rows and columns and using calculation techniques to forecast the effects of changes.**	Use prepared spreadsheet files to recognize and utilize the concept of "what if" to predict changes within the spreadsheet. *ClassWorks*, Activity 8.3.	**AppleWorks** *ClassWorks*, Lesson 8 **Microsoft Works**	
3. **Explain the advantages of an electronic spreadsheet (speed, accuracy, adaptability, accessibility, and variability).**	Compare the similarities and differences between pencil and calculator spreadsheets and electronic spreadsheets. Identify the advantages of using an electronic spreadsheet. *ClassWorks*, Activities 8.1 and 8.3.	**AppleWorks** *ClassWorks*, Lesson 8 **Microsoft Works**	
4. **Identify primary features of spreadsheet software (calculating and recalculating, formulas, functions, formatting).**	Use a prepared spreadsheet file to identify and use spreadsheet functions such as formulas and pointers. *ClassWorks*, Activity 9.1.	**AppleWorks** *ClassWorks*, Lesson 9 **Microsoft Works**	
5. **Set up a spreadsheet (layout and calculations) to produce predicted results.**	Demonstrate the use of formulas by adding them to a prepared spreadsheet file in order to produce specific results. *ClassWorks*, Activity 9.2.	**AppleWorks** *ClassWorks*, Lesson 9 **Microsoft Works**	

Learner Expectations	Student Activities	Resources	Integrated Activities
6. **Output report files to the screen and printer.**	Use the open apple - P command to print a hard copy of a spreadsheet file. Example: Party spreadsheet file.	**AppleWorks** *ClassWorks Student Data Disk* **Microsoft Works**	
7. **Develop understanding of the wide variety of applications of spreadsheet information.**	Identify a variety of applications for spreadsheet use in the home, at school and in the workplace. Lesson review, p. 171.	*MacMillan Computer Literacy*, Chapter 8	Identify specific subject area applications for spreadsheets: Math: Areas of circles and quadrilaterals, metric conversion tables (metre to kilometre, gram to kilogram, etc.).
8. **Assess spreadsheet software based on general (e.g., ease of use, clear directions, graphic displays, useful features) and personal criteria.**	Outline personal assessments for the spreadsheet software using criteria listed in *MacMillan Computer Literacy*, pp. 101-103, as a guide.	*MacMillan Computer Literacy*, Chapter 4	
9. **Integrate spreadsheet and word processing files to produce a document (where software permits).**	Use a spreadsheet file (e.g., Remodel, *ClassWorks* Student Data Disk) as a starting point for a letter of request for a bank loan. Use the clipboard to integrate the spreadsheet into the letter as justification for the loan.	**AppleWorks** *ClassWorks*, Lesson 11 **Microsoft Works**	Math: Using the spreadsheet file "metric conversion tables" designed in the activity I.7, use the clipboard to integrate the spreadsheet with a word processing document which gives directions on using the conversion spreadsheet file.
10. **Develop skills of data input through appropriate review and practise of keyboarding skills.**	Ongoing use of proper keyboarding techniques as learned in Modules 5 and 6.	See Modules 6 and 7 of this TRM.	
11. **Create a new spreadsheet (layout and formulas) designed to provide solutions to specific problems in another subject area.**	Create a spreadsheet by following a series of procedures (define the problem, build formulas, etc.) to solve a specific problem. Examples: a personal grade book to keep track of marks in specific subjects, a statistical sheet for the basketball team, calculations for interest on loans, a personal budget sheet. *ClassWorks*, Lesson 10.	**AppleWorks** *ClassWorks*, Lesson 10 Module 13: Integration Activities **Microsoft Works**	Science: Design a spreadsheet for the purpose of doing energy conversions (e.g., work = force x distance). Science/Math: Design a spreadsheet which will do the calculations for distance, time and rate problems. Health: Design a spreadsheet which calculates the amounts, time and costs involved in smoking regularly.

Teacher Tips:

- Because of the nature of the spreadsheet activities, spreadsheets are most successfully introduced to more mature students. Younger students can successfully use spreadsheets that already have the formulas in place.
- Encourage students to ask questions using the spreadsheet (what if?) and to test their hypotheses by making changes in the data.

MODULE 14: Electronic Communications

Prerequisite: All Mandatory Modules

This module introduces students to communications software as well as to the broad spectrum of electronic communications.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **Use the vocabulary and concepts of electronic communications (baud rate modulate/demodulate, binary, analog, digital data transmission, electronic messaging, on-line, logon, logoff, password, access code, electronic data base, down-load, up-load).**	Research and record concepts and terminology related to electronic communications. Lesson review, p. 185, Q 1-6.	*MacMillan Computer Literacy*, Chapter 9 Proterm manual.	
2. **Recognize the basic concepts of electronic communication.**	Illustrate with the help of diagrams, the concepts of log on, log off, up-loading, down-loading and data transfer between two stations. Connect two computers together with a null modem. Use telecommunications software in "chat" mode to simulate electronic communications.	*MacMillan Computer Literacy*, Chapter 9 Proterm (see Appendix for details on using a null modem).	
3. **Identify the advantages/disadvantages of electronic communications.**	Identify perceptions of the advantages and disadvantages of electronic communications as compared to conventional forms of communication such as mail service, telephone, person-to-person, fax.		
4. **Identify a wide variety of electronic communications devices and services (e.g., pocket pagers, cellular telephones, teleshopping services, fax transmission, teleconferencing, networking).**	Create a collage, mind map or bulletin board to illustrate and define a variety of electronic communications devices. Invite members of the community (e.g., AGT) to your class to discuss various devices available for communication.	See teacher tips for suggestions on compiling resources.	
5. **Calculate the potential cost of electronic communications with computers (e.g., telephone hook-up, long distance charges, membership to messaging services and/or data banks).**	Contact agencies such as AGT, iNET 2000, Compuserve, etc., to calculate potential costs involved in electronic communications by making inquiries about: telephone hook-up, long distance charges, membership to services, start-up and monthly charges, on-line fees. Calculate the relative costs for one hour on-line time for electronic mail.	See list of remote data banks in the Telecommunications section of this TRM.	
6. **Explain the function of a modem.**	View a videotape that describes the functions of a modem. *MicroComputers for Learners*, Program 9. Act out (role play) the functions of modem operation. Lesson review, p. 185, Q 7.	*MacMillan Computer Literacy*, Chapter 9 *MicroComputers for Learners*, Program 9	

Learner Expectations	Student Activities	Resources	Integrated Activities
7. **Demonstrate correct operation of a modem.**	Use communications software and a modem operations manual to set up a modem for communications. Examples: configure the modem to proper settings for communication with a local or regional bulletin board.	Proterm/Proterm manual Modem manual	
8. **Demonstrate the ability to send and receive electronic mail.**	Use local bulletin board, iNET, Envoy or school-to-school link to demonstrate correct procedures for sending and receiving E-Mail. Use *Kid Mail* software, to demonstrate correct procedures for sending and receiving E-Mail.	*Kid Mail* (documentation for using *Kid Mail* is stored on the program disk; see teacher tips for details).	Language Arts, Social Studies: Use *Kid Mail* to correspond with students in another class, school or within the district.
9. **Demonstrate the ability to access a remote data bank to search for specific information.**	Use communications software to access a remote data bank. Practise capturing text from the data bank and moving the file to disk.	Proterm	
10. **Demonstrate the ability to search a remote data bank, using electronic communications to complete a research assignment for another subject area.**	Use communications software to access a remote data bank. Capture information related to a topic being researched (e.g., copyright information on software). Edit the information for use in the report.	Proterm	Social Studies: Access a news-based service (data bank) to gather information on a current topic (e.g., Middle East relations). Science: Access a weather service (data bank) to gather information on weather patterns over a period of time.

Teacher Tips:

- Many learner expectations in this module are based on the use of a modem and access to a telecommunications system such as iNET 2000. If the unit is to be completed, a school must take steps to acquire the tools and memberships essential to participate in electronic communications.
- As this is a new field of study for most teachers, a file on electronic communications should be developed. Examples: A file can be made for electronic communications devices by writing to various agencies (AGT, CanTel Inet, Envoy, etc.). See the Support Resources Section of this TRM for addresses.
- Information can be collected from current periodicals and news articles.
- Check to see how you are being charged while on-line. Is it by the length of time you are signed on or is it a character count of your messaging? iNET charges by the length of time on-line, making it less expensive if you compose off-line.
- Due to cost factors such as long distance and on-line charges involved in using modem and remote data banks, the teacher may discretely use the Aspen Network to illustrate the use of a modem and telecommunications software. Aspen is a bulletin board sponsored by the Alberta Response Centre and is identified for use by students.
- To reduce on-line costs of telecomputing, have students compose their messages on a word processor before signing on to a bulletin board (off-line). Once they are signed onto a bulletin board (on-line), their composed message can be quickly loaded (upload) from disk and sent.
- Students generally are more conscientious of their work when the results are being sent out to an audience. Make arrangements with a neighbouring school to share student work through telecommunications.
- AGT can be contacted for information on installing or switching to a direct line for a classroom.
- When purchasing a modem, consider that on-line costs decrease with higher baud rates.
- *Kid Mail* documentation is stored on the program disk. To print out a copy of the documentation: use a computer attached to a printer, boot the computer using a DOS 3.3 system master, insert the *Kid Mail* program disk, type RUN PRINT DOCUMENTATION.

MODULE 15: Word Processing – Extension **Prerequisite: All Mandatory Modules**

This module expands the students' knowledge of and familiarity with the operation of a word processor.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **Use standard formatting rules by:** a) **identifying and demonstrating the proper use of format functions (tabs, margins, hanging indentations)** b) **changing document format (adjusting margins, line format, tab settings and page formats).**	Use the open apple-0 command to access the options menu. Demonstrate proper use of format functions using prepared word processing files. *ClassWorks*, Activity 3.1. Demonstrate various formats by printing a file in several different ways including newspaper and report format. *ClassWorks*, Activity 3.2.	**AppleWorks** *ClassWorks*, Lesson 3 *ClassWorks Student Disk* **FrEdWriter Writer** **LogoWriter Secondary** **MouseWrite** **Microsoft Works**	
2. **Use block functions (cut and paste, delete, move, copy).**	Use a word processing file to manipulate text with block functions. *ClassWorks*, Activity 2.3.	**AppleWorks** *ClassWorks*, Lesson 2 *ClassWorks Student Disk* **FrEdWriter Writer** **LogoWriter Secondary** **MouseWrite** **Microsoft Works**	Social Studies: Use block functions to revise an assignment in another subject area (e.g., correcting a file containing social studies questions with a few incorrect answers).
3. **Produce class assignments (e.g., letters, lists, compositions and/or assignments from other subject areas).**	Write a letter that requests information from various sources (e.g., AADAC, travel agencies, government embassies, government agencies). Write a letter to an appropriate person or agency that expresses concerns related to a subject the student feels strongly about (e.g., drinking water quality, animal rights, abortion, working conditions for young people, native rights, world hunger).	The Writing Process Using the Word Processor	Social Studies/Science/Math: Create vocabulary lists for current units.
4. **Assess word processing software based on general and personal criteria.**	Use the word processor to write an evaluation of the tool. Include advantages and disadvantages of the package. Compare more than one word processing program according to ease of use, advantages and disadvantages.	*MacMillan Computer Literacy*, Chapter 5, pp. 101-103	
5. **Use desktop accessories (e.g., spell checker, grammar checker, thesaurus) to correct errors.**	Use a commercially available spell checker, thesaurus or to correct one or more word processing files (own or pre-made files) (e.g., TimeOut QuickSpell or Pinpoint Spelling Checker for AppleWorks, MouseWrite spell check, or built-in spell checker in AppleWorks 3.0).	**MouseWrite spell check (built in)** Multiscribe spell check (built in) TimeOut QuickSpell Pinpoint Spelling Checker Webster's Spell Checker The Writing Process Using the Word Processor **Microsoft Works**	All subject areas: Use a spell checker to correct word processing files developed for use in other subject areas (e.g., vocabulary lists).

Learner Expectations	Student Activities	Resources	Integrated Activities
6. Identify the advantages/disadvantages of spell checker and/or grammar checker software.	Identify specific advantages (e.g., speed of correction) and disadvantages (e.g., highlighting of proper names as possible errors) of the spell checking program being used.	**MouseWrite spell check** Multiscribe spell check The Writing Process Using the Word Processor	
7. Integrate word processing documents with spreadsheets, data base and/or graphics to produce a document (where software permits).	Use pre-made files to integrate either a spreadsheet file or a data base file with a word processing file. *ClassWorks*, Activity 11.1.	**AppleWorks** *ClassWorks*, Lesson 11 *ClassWorks Student Disk* **Microsoft Works**	
8. Investigate an area of personal interest from another subject area(s) through independent planning, teacher assisted planning or selecting a topic from teacher prepared options to produce a multi-page document.	See Integration Activity 8. *ClassWorks*, Activity 11.1.	**AppleWorks** **MouseWrite** Multiscribe The Writing Process Using the Word Processor **Microsoft Works** **FrEdWriter Writer** **LogoWriter Secondary**	Social Studies/Language Arts: Apply the writing process to write a position paper on an area of personal concern (e.g., toxic wastes, acid rain, nuclear weapons, capital punishment, Canada as the 51st state). Social Studies: Apply the writing process to report research (e.g., historical biographies, historical events, research on an individual country, province, state, city or town). Language Arts: Produce a document containing personal poetry, short story or short stories.

Teacher Tips:

- As word processing lends itself easily to integration, the computer teacher may wish to take the time to discuss the possibilities for including subject area assignments in the word processing unit. These could be graded by the computer studies teacher as word processing assignments and/or by the subject area teacher of resource content.

THEME 4: Programming

Computers need instructions to complete tasks; that is, what to do and when to do it. This theme provides students with an introduction to creating lists of instructions, called "programming." Programming topics in the theme include programming languages, custom programming and advanced programming.

MODULE 16: Programming – Introduction (Mandatory) **Prerequisite: Module 1 – Computer Operations**

This module provides the opportunity for students to explore the possibilities of controlling the computer by programming.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Demonstrate understanding of computer programming in BASIC by: **a) planning, designing and operating simple programs using commands (NEW, HOME, PRINT, RUN, FLASH, INVERSE, NORMAL, LIST, REM, TAB, HTAB, VTAB, GOTO, END, SAVE)**	Review disk handling procedures from Module 1. Use a sample data disk CATALOG, LOAD, RUN and LIST programs. Code and enter programs in immediate mode using NEW, PRINT, and HOME.	*Introduction to BASIC* , pp. 10-13; 14-18 *MacMillan Computer Literacy*, pp. 266-267	Title pages (using text graphics) in other subject areas.
b) coding, running and documenting programs (REM statements)	Code, enter and save programs in deferred mode using HOME, PRINT, REM, and SAVE. Code, enter and save programs to display kinds of print using NORMAL, INVERSE, FLASH, SPEED. Code, enter and save programs to position text on screen using VTAB, HTAB. Exercises, p.25.	*Introduction to BASIC*, pp. 48-49 *MacMillan Computer Literacy*, pp. 266-269 *Introduction to BASIC*, pp. 36–41; 42-46	Math/Science: Graphing and plotting activities.
c) outputting to disk, screen and printer	Code, enter and save programs that branch, using GOTO, END. *Introduction to BASIC* exercises, pp. 136-137. Run and print listings of previously saved programs using PR#1, PR#0 or other commands listed in printer manual.	*Introduction to BASIC*, pp.71-90; 96-102; 130-136 Printer manual	
d) editing and "debugging" simple programs (both student-generated and other)	Debug programs using "edit mode" from teacher prepared data disk. Exchange programs with other students for debugging. Exercises, p. 52.	*Introduction to BASIC*, pp. 54; 96-103 Apple User's Manual Teacher supplied resource	
e) using arithmetic symbols to solve problems	Use arithmetic operators + , –, *, /, < to solve simple problems. Exercises, p. 14. Use order of operations to solve multi-step problems. Exercises, p. 14.	*Introduction to BASIC*, pp. 62-70 Any Grade 7 Math Text	Complete assignments (computation, order of operations) given in math class.
f) drawing simple Lo-Res pictures (program or drawing programs). And/Or	Draw Lo-Res pictures using drawing program such as Master Graphics and save. Code, enter and save Lo-Res pictures using TEXT, GR, COLOUR + , PLOT HLIN, VLIN. Exercises, p. 34.	*Master Graphics Disk* *Introduction to BASIC*, pp. 112-127 Programming Exercises in Basic for Microcomputers Basic Discoveries Useful journals (Computing Teacher)	Title pages (using text graphics) in other subject areas. Graphs and diagrams for social studies and science. Maps for social studies. Illustrate stories in language arts. Slide show of historical events in social studies.

Learner Expectations	Student Activities	Resources	Integrated Activities
Demonstrate understanding of computer programming in Logo by: **a) designing and operating simple procedures, using commands (FORWARD, BACK, RIGHT, LEFT, HOME, SHOWTURTLE, PENUP, PENDOWN, PENERASE, SETC, SETBG)**	Draw simple shapes (geometric and non-geometric) using FORWARD, BACK, RIGHT, LEFT, CLEARSCREEN (e.g., square, rectangle, flower, car). Draw several shapes on the same page using PENUP, PENDOWN, SHOWTURTLE, HIDETURTLE (e.g., house and car, cloud and bird).	*Introduction to Programming in Logo Using LogoWriter*, pp. 5-6; 8-10; 10-12; 13-16; 38-40	Title pages in other subject areas. Graphs and diagrams for social studies, mathematics and science.
b) coding and operating programs, using proper syntax	Code, enter, save and print programs for simple shapes with titles or labels (e.g., house, sailboat, car). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 12.	The Turtle's Sourcebook Apple Logo in the Classroom-MECC	Maps for social studies. Illustrate stories in language arts.
c) outputting to disk, screen and printer	Code, enter, save and print simple shapes in colour using SETC, SETBG. Project Suggestion: *Introduction to Programming in Logo Using Logo Writer*, p. 16.	Teacher, Kids and Logo Learning Math with Logo	Slide show of historical events in social studies. Video bulletin board for other classes
d) editing and debugging simple programs (both student and other) **And/Or**	Debug programs from teacher-prepared data disk. Exchange programs with other students for debugging.	Logo Discoveries Logo in the Classroom Learning with Apple Logo	
Demonstrate understanding of computer programming in another programming language (e.g, Pascal, Machine, Hyper Media).			

Teacher Tips:

- Have a data disk with programs (may belong to former students) prepared at beginning of year to motivate and give practice in using basic commands
- Have a second data disk with programs that have errors in them (some actual student programs) to use in class.
- Establish structure for programming early (e.g., code [using M statements], enter and save).
- In graphics, insist they do a "Graphics Screen" sheet (to get all locations) before coding and entering programs. See Appendix for sample copy
- Have students decode programs on coding sheet (see Appendix) before entering program at computer.
- Text graphics is a good way to practise using text on screen.
- For making graphics programs, have students use split screen and place title and their name in text at bottom. If using full screen, have title and name as part of the graphic
- If lack of time is a problem, then use drawing programs (Master Graphics for Lo-Res and Graphic Master for Hi-Res).
- Answers for lesson plan worksheet, Module 16, are found on demonstration part of lesson plan.

MODULE 17: Programming – Extension

Prerequisite: All Mandatory Modules

This module allows students to explore more complex programming concepts and procedures.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Program increasingly complex routines in BASIC by: **a) using programming vocabulary (GOSUB/RETURN, READ/DATA, FOR–NEXT with both positive and negative steps, timing loops, numeric/string variables, INPUT, LET, IF/THEN)**	Code, enter and save structured programs using GOSUB/RETURN (e.g., printing names with delay loops as subroutine). *Introduction to BASIC* Exercises, p. 144. Code, enter and save structured programs using FOR–NEXT (e.g., printing name 15 times).	*Introduction to BASIC*, pp. 138-144; 288-291; 285-309	Write short quiz for other subject areas giving feedback on answers.
b) planning programs with flow charts, using branches, subroutines, editing and "debugging"	Code, enter and save structured programs using FOR–NEXT with positive and negative steps (e.g., counting by 5 from 0 to 50, 50 to 9). *Introduction to BASIC* Exercises, pp. 297-298; 308-309. Code, enter and save structured programs using READ/DATA (e.g., printing the days of the week). *Introduction to BASIC*, pp. 378, 386.	*Introduction to BASIC*, pp. 361-378 *MacMillan Computer Literacy*, pp. 279-280	Write program to find students' averages for other subject areas.
c) writing structured programs to provide problem solutions	Identify basic flow chart symbols. Draw flow charts for tasks (e.g., making a phone call, doing homework, getting ready for school). Draw flow charts, code and enter programs for tasks (e.g., printing out numbers from 1 to 10 vertically, counting to 50 by fives, listing your name 25 times, deciding whether a number is odd or even) and then print a message for each result. *Introduction to BASIC* Exercise, p. 190.	*Introduction to BASIC*, pp. 155-176 *MacMillan Computer Literacy*, pp. 244-245	Use flow charting as a basis in solving problems in mathematics and science.
d) identifying the differences and similarities between Lo-Res and Hi-Res graphics	List similarity between having full or split screen. List 3 main differences: size of pixels (Hi-Res smaller), choice of colours (only 4 different in Hi-Res) number of drawing commands needed (Hi-Res has fewer).	*Introduction to BASIC*, pp. 112-127	
e) drawing simple Hi-Res pictures (program or drawing programs)	Draw Hi-Res pictures using drawing program such as Graphic Master and save. Exercise: Use tutorial on disk to explore capabilities of Graphic Master Program. Code, enter and save Hi-Res pictures using TEXT, HGR, HCOLOUR =, HPLOT. Choose a previously drawn Lo-Res program and redraw in Hi-Res. Compare pictures.	*Graphic Master* disk	Complete assignment given in art class.

Learner Expectations	Student Activities	Resources	Integrated Activities
f. designing programs that will use both Lo-Res and Hi-Res graphics. **And/Or**	Code and enter an Art Show of his/her work (e.g., by having last line of one program call up next program or using PRINT CHR$(4); and BLOAD program).		
Program increasingly complex routines in Logo by: **a) learning programming vocabulary (REPEAT, Recursion)**	Code, enter and save a procedure to draw geometric shapes (symmetric and non-symmetric) using REPEAT (e.g., squares, triangles, rectangles, circles).	*Introduction to Programming in Logo Using LogoWriter*, pp. 8-10	Complete geometry assignment given in math class.
b) using Logo arithmetic commands to make calculations	Use arithmetic operators +, −, *, / to solve simple problems. Use order of operations to solve multi-step problems.	*Introduction to Programming in Logo Using LogoWriter*, pp. 106-107 Any Grade 7 Math Textbook	Complete computation assignment given in math class.
c) using a procedure that calls itself a subprocedure (Recursion) to create interesting patterns	Code, enter and save a procedure to draw a design using a subprocedure. Code, enter and save a procedure to print out a repetitive saying. Code, enter and save a procedure to print out the days of the week over and over. Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, pp. 64; 70.	*Introduction to Programming in Logo Using Logo Writer*, pp. 63-64; 69-70; 98-99 *Introduction to Programming in Logo Using LogoWriter*	Repetitive poem for language arts class.
d) developing a superprocedure (make the turtle draw the entire shape) for more complex shapes	Code, enter and save a procedure that counts using recursion. Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 105. Code, enter and save a procedure that includes multiple procedures (e.g., house and sign flashing). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, pp. 37-40.	*Introduction to Programming in Logo Using LogoWriter*, pp. 34-37; 38-40; 98-101	Complete assignment given in art class.
e) using Logo in problem solving. **And/Or**	Code, enter and save procedures to solve various problems (e.g., table of values, mean, median, mode, area). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 87.	*Introduction to Programming in Logo Using LogoWriter*, p. 87	Complete statistics assignment given in math class. Title pages, graphs and diagrams in other subject areas. Illustrate stories in language arts. Slide show presentations in other subject areas.
Program increasingly complex routines in another programming language (e.g., Pascal, Machine, Hyper Media).			

Teacher Tips:

- Continue structured approach (top down method suggested) to programming begun in Module 16. Insist on use of coding sheet, enter and save as steps to follow.
- Continually be on the lookout (in resources and elsewhere) for problem-solving applications.

MODULE 18: Custom Programming and Problem Solving **Prerequisite: Module 17: Programming – Extension**

This module provides students with the opportunity to further develop their programming skills.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Design and operate programs through advanced programming techniques in BASIC by: **a) using programming vocabulary (RND, INT, Array, LEFT$, MID$, RIGHT$, LEN$, PEEK, POKE, CALL)**	Code, enter and save programs using INT, RND (e.g., integer value for any decimal, outcome of a die and a pair of dice, random Lo-Res plots). *Introduction to BASIC*, pp. 248-250. Code, enter and save programs using LEFT$, RIGHTS$, MID$, AND LEN$. Code, enter and save programs using arrays. *Introduction to BASIC* Exercise: At the Computer #2. Participate in a discussion of the meaning of PEEK, POKE and CALL and their uses.	*Introduction to BASIC*, pp. 235-250; 410-422 *MacMillan Computer Literacy*, pp. 280-283 Applesoft II programming reference manual, pp. 40-43	Have students create a short CAI lesson for a topic in another subject area.
b) designing and operating programs incorporating advanced programming techniques for problem solving (e.g., sports statistics, hockey pools, personal inventories, title pages, marks processing)	Code, enter and save programs (e.g., title pages using text and graphics, percent given total and mark).		
c) using graphic techniques and capabilities to enhance programs	*Introduction to BASIC* Exercise, pp. 283, 320, 331, 340, 355.		
d) using advanced graphics for animation of objects (moving objects, backgrounds). **And/Or**	Using FOR/NEXT and TAB, code, enter and save a program in text graphics in which an object (e.g., a happy face) moves from left to right on screen. Change previous program so object moves from right to left on screen and save. Code and enter in text graphics an object falling on the screen. Save. Code and enter in Lo-Res graphics an object moving on the screen (horizontal or vertical).	*MacMillan Computer Literacy*, pp. 176-177	
Design and operate procedures through advanced programming techniques in Logo by: **a) using programming vocabulary (RANDOM, BUTFIRST, BUTLAST, EMPTY?, EQUAL?, IDENTICAL?, LPUT, PARSE, TEXTLEN, TEXTPOS)**	Code, enter and save a procedure using RND (e.g., colours). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 16. Code, enter and save simple procedures using FIRST, BUTFIRST, LAST, BUTLAST, PARSE (e.g., using words and phrases). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 146. Code, enter and save procedures using TEXTLEN, TEXTPOS (e.g., word lists). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 129. Code, enter, and save procedures using FPUT, LPUT (e.g., words, phrases). Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 155.	*Introduction to Programming in Logo Using LogoWriter*, pp. 15; 127–129; 143–146; 154–155	Have students create a short CAI lesson for a topic in another subject area.

Learner Expectations	Student Activities	Resources	Integrated Activities
b) designing and operating procedures incorporating advanced programming techniques for problem solving (e.g., animation, music, textual presentation)	Code, enter and save procedures to make a simple figure move (e.g., turtle, boat, plane). Project Suggestions: *Introduction to Programming in Logo Using LogoWriter*, p. 68	*Introduction to Programming in Logo Using LogoWriter*, pp. 65-68	
c) using a combination of advanced programming techniques for demonstrating principles from other subject areas	Code, enter and save procedures to play a simple tune. Project Suggestion: *Introduction to Programming in Logo Using LogoWriter*, p. 51.	*Introduction to Programming in Logo Using LogoWriter*, pp. 50-51	
d) controlling graphic sprites in a spatial environment to solve problems from other subject areas (e.g., graph linear functions, area problems) **And/Or**	Code, enter and save procedures to solve math formulas (e.g., area, perimeter, volume). Project Suggestion. *Introduction to Programming in Logo Using LogoWriter*, pp. 114-115.	*Introduction to Programming in Logo Using LogoWriter*, pp. 110-115	
Design and operate programs through advanced programming techniques in another programming language (e.g., Pascal, Machine, Hyper Media).			Have students create a short CAI lesson for a topic in another subject area.
2. Evaluate personal programs recognizing their potential and limitations.	Based on criteria of: i) clear on-screen instructions ii) easy to follow prompts iii) no clutter on screen iv) not too much key pressing v) protection from own errors (does not crash easily), write paragraph explaining how one of their programs does or does not meet these criteria. Then explain what the program could be used for. Activity: *MacMillan Computer Literacy*, p. 105, #3.	*MacMillan Computer Literacy*, pp. 101-103	
3. Develop instructions for a moderately complex program.	Take a previously written program and develop a user manual that other students can follow.		

Teacher Tips:

- Integer and random functions have many applications in math and graphics. Continually look for applications.
- Students will have to be continually fed ideas for applying advanced programming techniques.

MODULE 19: Second Language Programming

Prerequisite: Module 17: Programming – Extension

This module provides students with the opportunity to develop their programming skills in a second programming language.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Demonstrate an understanding of computer programming in a second language (e.g., Logo, BASIC, Pascal, Machine, Hyper Media) by: **a) using the vocabulary and commands required** **b) using the hardware, software, print material specifications required** **c) establishing the correct syntax and/or structure for the language.**	a) Write a report on two or more computer languages and their major areas of use (science, math, business, etc.). Participate in a class discussion of chosen second language and its major area of use. Also include other available versions such as Standard Pascal, Apple Pascal, etc. b) Use a tutorial disk, program disk, or manual to learn operating system (e.g., startup procedures, basic commands, file handling, simple edit features) of second language. Complete exercises on use of operating system. Code, enter and save simple programs using a few basic commands (e.g., using WRITE, WRITELN, BEGIN, END in Pascal) in second language. c) Code, enter and save programs that establish syntax for second language (e.g., variables and statements, control statements, procedures and functions, and mathematical functions if applicable).	*MacMillan Computer Literacy*, pp. 232-241 *Journeys in Math 9*, pp. 54-55 Library *MacMillan Computer Literacy*, p. 234 For BASIC use resources for Modules 16-18. For Logo use resources for Modules 16-18. For other languages find appropriate resources. A Guide to Programming in Apple Pascal Pascal Discoveries Apple Pascal: A Hands-On Approach	For BASIC use ideas from Modules 16-18.
2. Compare advantages/disadvantages of the second language to BASIC or Logo.	Participate in a discussion or write a report comparing the advantages/disadvantages of the second language to BASIC (e.g., high or low level language, purpose, simplicity in learning, ease of use, structure, logic, data handling capabilities, problem-solving uses).		For Logo use ideas from Modules 16-18.
3. Use appropriate editing steps to modify and/or correct procedures.	Use more advanced edit commands to create, modify and save files (e.g., Pascal – text, move, rename, text files, work files, repeat factors).		For other languages use ideas from Modules 16-18 and from your other selected resources.
4. Develop formatting skills to provide hard copy output.	Use instructions from manual to print program listings and disk directories. Use program statements to choose outputs to either screen, printer or both from within program.		

MODULE 20: Second Language – Extension

Prerequisite: Module 19: Second Language Programming

This module provides students with the opportunity to further develop their programming skills in a second programming language.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Use advanced techniques and concepts related to the use of the second computer language and its applications to problem-solving situations.	Code, enter and save programs that establish syntax for second language (e.g., arrays, graphics, data structures, other special features of language).	For BASIC use resources for Modules 16-18. For Logo use resources for Modules 16-18.	For BASIC use ideas from Modules 16-18.
2. Use correct commands and syntax.		For other languages find appropriate resources.	For Logo use ideas from Modules 16-18.
3. Demonstrate editing, "debugging" and recoding techniques using advanced language instructions.	Code, enter and save programs solving problems related to area of use (e.g., science, math, business, etc.) using any advanced edit features available to the second language.	*MacMillan Computer Literacy*, pp. 232-241 Library	For other languages use ideas from Modules 16-18 and from your other selected resources.
4. Use advanced applications of a second language in a variety of problem-solving situations.			
5. Identify specific uses of the second language program.			
6. Design and operate a user-friendly program in a second language program.			
7. Use proper documentation techniques suitable to the language (e.g., using REM statements in BASIC).			

Teacher Tips:

- Choose reference materials that provide a varied selection of problems in major area of use for that language.

Theme 5: Society

As a tool of an information-based society, computers play a significant role. This theme introduces the student to the impact of computers on society through issue identification, trend identification, historical developments, artificial intelligence and robotics.

Module 21: Societal Issues – Introduction (Mandatory) **Prerequisite: None**

This module introduces students to issues and concerns resulting from the impact of computer technology on the individual and society.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. **List personal uses of computer technology in daily activities.**	Make scrapbook pages with as many photographs as possible of devices that contain at least one microprocessor chip, each photograph to be accompanied by a short description of what that chip does. Students choose two everyday activities (e.g., making a meal), and write a description of these activities as they imagine their parents did those activities when they were the same age as the students, as the students do them now, and as they imagine their children will do them at that age. If a word processor is available to the students, and a variety of activities chosen, the teacher may organize these descriptions into a class project.	Collection of magazine articles and newspapers *MacMillan Computer Literacy*, Chapter 1, pp. 8-10 *MacMillan Computer Literacy*, Chapter 17, pp. 375-378 *The Dream Machine*: Vol. 1, Side 1, Chapters 4, 26, 27, 29, 43 Side 2, Chapters 3-5, 8, 14, 19, 21-24, 38-42, 50, 58, 59	Language Arts: This could be done as a joint descriptive writing assignment. Social Studies: The student will need to do research into technology and lifestyles in the 1950s and 1960s.
2. **Identify benefits and limitations of computer technology.**	People disagree about whether many of the uses that computers are put to are good or bad. Students will prepare a list of at least five items in two categories: i) Computers are good when. . . . (e.g., they make it easier to do your work) ii) Computers are limited because. . . . (e.g., they put people out of work) Following this, a master list can be created that includes the five most-chosen items in each column. The class can then try to use the master list to decide whether some current applications are "good" or "bad" (e.g., automated tellers, automated gas pumps).	*MacMillan Computer Literacy*, Chapter 1, pp. 12-14 *MacMillan Computer Literacy*, Chapter 17	Social Studies: Compare with attitudes toward machines at the start of the industrial revolution.

Learner Expectations	Student Activities	Resources	Integrated Activities
3. Analyze the need for the protection of privacy regarding storage of personal data by researching human rights issues (e.g., privacy of the individual, freedom of information).	Read a short story (word processor file) about a student refused work at a fast food business, or at another realistic job opportunity because: i) He was often truant in Grade 6 ii) He had shoplifted in Grade 6 iii) He had belonged to a street gang in Grade 6. Answer a questionnaire following the story, print out answers, and be prepared to discuss them in class. Questionnaire items should include: i) How might the manager have gained access to the information? ii) Did the manager have the right to that information? iii) Should there be time limits on how long computer records are kept? What are appropriate time limits? iv) Should there be rules about who can have access to computer records about people? What would be some fair rules to make? It would be possible, with unlimited access to data bases now in existence, to find out the following information about a person: how much money he makes, whether he has a part-time job, his vital statistics, the condition of his health, whether he ever had a mental breakdown or a broken leg, what kind of books he likes to read, what kind of restaurants he likes, where he likes to shop for clothes, and so on. Students will: i) List business and agencies who maintain an appropriate data base for each of the above examples. ii) Prepare, in table form on a word processor, a chart indicating whether they think the following people should have unrestricted access to each of those data bases: police, doctors, prospective employers, creditors, salespersons, the general public.	This resource material is provided as an AppleWorks WP file, and in the Appendix of this document. These can be used as source documents for discussion of this activity: bank loan applications, application forms for credit cards, income tax return forms, credit card bills, library overdue notices.	Social Studies: Changing values in a computerized society. Health: Units on futures and careers.

Learner Expectations	Student Activities	Resources	Integrated Activities
4. Understand the ethical use of computers by: **a) demonstrating awareness of present copyright laws** **b) recognizing practices that are an infringement of present copyright laws** **c) listing safeguards that have been developed to prevent unethical use of computers** **d) identifying concerns relating to computer crime (e.g., trojans, viruses, worms, and hackers).**	Students read a paragraph that introduces them to the basic issues involved in copyright violation. A list of activities that might violate copyright laws in Canada follows the paragraph. Students will rate each of the items by these criteria: Are they illegal in Canada? Are they justified activities? Do these activities constitute stealing? A general class discussion of the rated list follows. During the discussion, mention should be made of: i) Theft of intellectual property is as much "real" theft as theft of material goods. ii) The number and quality of available videos, computer programs, etc., is dependent on how much money the authors and producers can make. Software theft, along with other copyright violations, degrades the quality of product available. Encourage students to use an encrypter for their word processor files, if one is available. (An example might be to use the Rebus characters in Multiscribe.) Demonstrate and discuss the need for an encrypter, if one is not available for general use by the students. Students read the article "A Hacker-Proof System" in *MacMillan Computer Literacy* and make a list of ten major computer systems that might need to make use of such a system of locks and possible consequences of failure of those locks (e.g., hospitals, banks). Using a computer virus as an example, students: i) Define, through discussion or research in appropriate magazines, what a computer virus is and does. ii) Attempt to understand the motivation behind the creation of computer viruses (e.g., demonstration of computing genius, desire to destroy). iii) Explain the need of a computer-using society to defend itself against such viruses. iv) Try to discover some of the defenses invented so far. Have students explore, through class discussion, writing a paragraph, writing a short story, etc., their own feelings if a computer virus destroyed or altered: i) their marks ii) their library borrowing record iii) their parents' bank account iv) their medical records v) the guidance system of a cruise missile.	This resource material is provided as an AppleWorks WP file, and in the Appendix of this document. *MacMillan Computer Literacy*, pp. 340-345 *MacMillan Computer Literacy*, p. 339 Collection of magazine articles and newspapers	Health: Units on values. Language Arts: Have students do one of these as a creative writing assignment.
5. Develop an awareness of areas in which computers are playing an important role by researching issues dealing with the projected use of computers (e.g., areas of society such as government, commerce and architecture; entertainment, art and literature; libraries; handicapped devices, medical and health care systems; home appliances, games and automobiles).	Students choose a research topic in consultation with the teacher. Students present a word-processed research paper of appropriate length. This may be: i) incorporated into a classroom display with pictures and an oral presentation ii) compiled with others into a class book project.	*MacMillan Computer Literacy*, Chapter 10 Collection of magazine articles and newspapers *The Dream Machine.* Vol. 1, Side 1, Chapters 4, 26, 27, 29, 43 Side 2, Chapters 3-5, 8, 14, 19, 21-24, 37-42, 50, 58, 59	

M[illegible]le 22: Societal Issues – Extension

Prerequisite: All Mandatory Mod[illegible]

This module provides students with an opportunity to expand the issues from Module 21 to the application of computer technology in the home and workplace.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Project future job trends in terms of career planning and the changing job market by identifying jobs that are presently performed by: **a) robots and/or computers** **b) people working with computers** **c) people whose jobs may eventually be replaced by computers** **d) people whose jobs cannot be replaced by computers** **e) people whose jobs were created because of computers.**	Students bring to class several "help-wanted" pages from various newspapers. Some of the ways of handling the topic include: i) separate in some way the advertisements which mention the need for experience or knowledge of computers from those that don't make any mention of computers ii) discuss the non-computer jobs from the following points of view: are the jobs 'safe', or will they soon need computer experience?	*MacMillan Computer Literacy*, Chapter 15 Current newspaper help wanted ads *The Dream Machine:* Vol. 1, Side 1, Chapters 3-15, 17-38, 42-48 Side 2, Chapters 1-32, 44-61, Vol. 2, Side 1, Chapters 1-29, Side 2, Chapters 1-27	Social Studies: Compare the change from industrial society to information society as a result of introduction of computers to the change from agricultural to industrial society when steam engines and the machines they powered were introduced. Health: Computerization of the workplace has implications for job and career selection.
2. Analyze the issue of the implementation of computer technology versus human needs by: **a) listing criteria an employer would follow in choosing whether or not to use computer technology in the workplace (e.g., the issue of health and safety)** **b) comparing the moral implications of job creation/loss to the profit motives or business**	What criteria should an employer include? Positives might include: does it make the job safer? Increase profitability? Increase productivity? Negative considerations could include: does computerizing the job put someone out of work? Make things less convenient for customers (e.g., self-serve gas pumps)? i) have the students play the role of a consultant asked to advise a business on whether or not they should start using computers in their business. Students will generate a checklist the business manager can use to analyze his decision. Students may want to interview a systems manager to develop the checklist.		
	Have students read pp. 318-327 in *MacMillan Computer Literacy* and answer the questions at the end of the chapter. One of the suggested activities at the end of the chapter asks students to rewrite some help wanted ads from 40 years ago to read as they would today. This activity could be combined with the one above to project employment trends into the future (e.g., have students rewrite ads that do not require computer knowledge now to read the way they might in 2000 ad).	*MacMillan Computer Literacy*	Social Studies: These concerns are handled differently in different societies depending on the political structure. In societies where the state assumes more responsibility for welfare of workers, re-education may be less of an issue. In a laissez-faire economy, workers may have to assume more of this burden themselves.

Learner Expectations	Student Activities	Resources	Integrated Activities
c) **identifying alternatives for employees whose jobs may be changed due to computer technology.**	Students will be given a specific job situation to react to (e.g., mail sorters, secretaries, auto mechanics) in which a worker's job is threatened by the introduction of computer technology. Students will react to the following issues: i) Whose responsibility is it to ensure that the employee has an opportunity to retrain: the employer's or the employee's? ii) Do the employees have the right to protect their jobs by striking, protesting, etc., if the employer decides to introduce computer technology? iii) What are some non-confrontational alternatives that might ensure that employees get a fair shake as computer technology is introduced (e.g., educational allowances, time off to study)?		
3. **Identify and project changes in traditional and non-traditional male/female occupations using computer technology.**	Students read pp. 357-395, "Computers and Equity" in *MacMillan Computer Literacy*, and do the activities on p. 359. This lesson addresses not only male/female roles, but other equity issues as well. Students might want to discuss the following issues: i) Are there more boys or girls in their computer classes? Are the jobs that women usually get just as well-paying and satisfying as the jobs men usually get? ii) Will computers help women get better jobs?	*MacMillan Computer Literacy* *The Dream Machine*, Vol. 2, Side 1, Chapters 1-29	Social Studies: Can computerization of the workplace reduce male/female job inequity, or will existing social values govern who gets the "hi-tech" jobs? Health: Will computers help to solve male/female inequity in the workplace, or will they increase the inequity? What steps can we take to make sure the inequity is decreased?

MODULE 23: Growth of the Information Age **Prerequisite: All Mandatory Modules**

This module introduces students to the growth of the information age from a historical and a technical viewpoint.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Develop an understanding of the historical beginnings of computer technology by: **a) describing the early methods of representation and manipulation of information by mechanical or electronic means** **b) researching the developments leading to 1st generation computers** **c) using historical vocabulary (abacus, Hollerith card, tabulation, digital, electro-mechanical, vacuum tubes, transistors)** **d) summarizing the historical growth of computers from the 1st to the 5th generation.**	This activity could be approached by constructing a time line. i) Students could be asked to do research on their own, constructing the time line on a sheet of paper. ii) An alternative method would have the teacher construct the outline of the time line as a word processor file, and provide another file containing important events, having the students copy events from the data file into the time line file, then printing the product. This approach converts the activity into a "hands-on" computer activity, and lets the teacher focus the attention of the students on appropriate methods of information handling. The teacher will expand the time line data base to include such developments as vacuum tubes, transistors, and integrated circuits, or provide the student with appropriate texts, etc., for research purposes (e.g., Chapter 3, *MacMillan Computer Literacy*) i) The student will add information to his time line project as his research dictates. Students will construct a glossary of terms for their time line project, to be included in the final presentation. If the time line project has been done carefully, the student should be able to use his or her printout as a summary.	Information for the time line should be available to the student on a teacher-prepared data disk. If the recommended text is used, the relevant pages are pp. 9-83, *MacMillan Computer Literacy*, although the information in the text will have to be supplemented to make a time line project practical. This activity will require the teacher to extract relevant information from magazine articles, newspapers, etc., and put them into a form that the student can access readily. Time liner	Social Studies, Science, Mathematics: If this activity is treated as a time line, developments from any of these areas can be included on the time line. All three of these curriculum areas have milestone events that have an impact on the development of computers.
2. Examine the interrelationship between society and the historical development of the computer.	This topic also lends itself to a time line treatment. The teacher will have to guide the student in finding societal events that had impact on the development of computers (e.g., building the atomic bomb, development of a credit card society).		

Learner Expectations	Student Activities	Resources	Integrated Activities
3. Develop an understanding of computer technological changes by: **a) using 5th generation vocabulary (cryogenics, fiber optics, optical light circuits, parallel processing)**	Given that the research involved for this learning expectation will require magazine articles, many different textbooks, video presentations, and so on, the topic cannot be presented in a rigorous fashion. The teacher should find a quiz-game program that allows one to construct a word list, or obtain a word-search or crossword puzzle program and prepare suitable exercises for the students. These can be presented in a game situation, as contests, or used as activities that do not require access to a computer.	Magazine articles and teacher reference sources Crossword Magic Timeliner School Library *MacMillan Computer Literacy* Mind Tools	Language Arts: Students may wish to consult their language arts teacher about preparing a glossary. Computer Studies: This project can be done using a word processor or data base.
b) identifying the effect of technological innovation on computing power	Computing power can be defined in various ways. The student should be able to explain how word size (e.g., 8-bit, 16-bit) memory size (e.g., 4K, 64K, 128K, 1 meg) and microprocessor speed (e.g., 4 mhz) affect the computing power of a given computer. i) Students demonstrate their understanding of an analogy between the amount of memory a computer can access given a certain word size and the number of telephones that can be accessed given a certain length of telephone number. They might calculate how many users can be accommodated by a 7-digit telephone number, and how many more users can be accommodated by including an area code. ii) Students complete a chart that shows the "power" of the most popular microcomputers, using the ratings included above, and compare this to the statistics for the currently leading supercomputer, and to the first commercially available mainframe computers. iii) Students select those events (from their time line project) that enhanced computer power. If the time line project is maintained on a word processor or data base, a printed report will be presented.		
c) predicting future technological innovations.	The following activities are recommended. i) Begin a scrapbook of newspaper articles about computer advancements. In particular, students should look for articles about parallel processing, VLSI chips, etc. ii) Write a short story or paragraph describing the effects that the following innovations might have on their lives: voice recognition, visual discrimination, artificial intelligence. iii) Approach businessmen in the community, to find out what advances are imminent in their business.		Arts: In any activity that requires prediction, there is a rich potential for creative fiction. Students could write about, make videotapes about, or draw scenes of a future that contains their predictions about computers.

MODULE 24: Artificial Intelligence and Robotics

Prerequisite: All Mandatory Modules

This module provides opportunities for students to explore artificial intelligence and robotics.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Use a computer software package that illustrates artificial intelligence and/or an expert system.	One of the support resources, *A.I.: An Experience with Artificial Intelligence*, provides students with an excellent guided activity. The accompanying manual leads students through a series of activities in which they teach a computer program to beat them at a pattern-recognition game. If a public domain interactive conversational program is available, students: i) interview the program ii) devise a test to enable them to decide if the program is a machine or a human in another room.	*A.I.: An Experience with Artificial Intelligence*	
2. Report on the most current developments in the field of artificial intelligence and/or robotics.	Students will find at least one article on an expert system (e.g., medical diagnosis, aircraft control, stock purchase programs), and write a short description of: i) what the system does ii) who developed the system iii) who might benefit from the system iv) who might be harmed by the system v) what potential dangers are inherent in misuse or failure of the expert system.	Collection of magazines and newspaper articles "Animal Guessing Games" . . . on diskette for Apple IIe *MacMillan Computer Literacy* Movies: 2001 - A Space Odyssey War Games Access: Coming to a Factory Near You	

Learner Expectations	Student Activities	Resources	Integrated Activities
3. List the advantages/disadvantages of robotics in the home and workplace.	Students will: i) draw, using a graphics program or pencil and paper, their design for a household robot that performs a single task (e.g., intelligent can opener, carpet sweeper) ii) prepare a set of operating instructions for the robot iii) prepare an advertisement for their robot iv) present their design and advertisement to the class. During the class discussion of the robots, the following points should be brought out: i) Which design was the most popular, and what features made it so? ii) Which design seemed to generate the least interest, and how can that be explained?		Art: This activity can be coordinated with either art or industrial art in producing drawings of the robot. Language Arts: Advertisements can be evaluated for logic, misleading statements. Operating instructions can be evaluated for clarity.
4. Investigate the construction and operation of industrial and personal robots (e.g., home robot kits, factory machines, space robots, artificial limbs and devices for handicapped persons).	The student will focus on one particular robot that already exists. In preparing a research presentation, the student should try to: i) find an actual photograph of the robotic device ii) find out who designed the device, and where it is made iii) explain what the device does iv) explain why that robot device is better than whatever it replaces v) using a Fischer Technik Lego Tc Logo kit, the students shall construct, program, and operate one of the robots included in the instruction kit.	Collection of magazines and newspaper articles *Lego Tc Logo*	

Learner Expectations	Student Activities	Resources	Integrated Activities
5. Describe the development of supercomputers and expert systems.	Students will demonstrate their understanding of supercomputers by defining: i) vector processing ii) parallel processing iii) flop . . . floating point operation iv) megaflop v) dynamic modelling. Students will try to write down all the information needed for a computer programmer to make a computerized expert system that would: i) let the computer user know what their pet cat wanted when it meowed in complaint ii) let the computer user know when their best friend was in a bad mood and should be left alone. Students will make a chart of good and bad possibilities inherent in using these current expert systems: i) medical diagnosis by computer ii) airplanes flown by expert computer system iii) banking systems regulated by expert system iv) automobile diagnosis by expert computer system v) eyeglass prescription by computer.	Collection of magazines and newspaper articles	Language Arts: This activity can be used to have students practise outlining skills, in that the information would be more useful presented as an outline than in paragraph form.
6. Identify the advances made in 5th generation computers in highly industrialized societies.	Since no textbook is likely to be current enough to contain useful material of this nature, this topic can be covered only to the extent that a collection of magazines and articles is made available by the teacher. Some topics which can be pursued as reading assignments are: i) comparison of how the human brain works to how a computer works at problems ii) problems involved with computer vision . . . how can we make a computer "see"? iii) what is parallel processing? Why do computer experts feel that parallel processing is necessary before we can make a break-through in artificial intelligence? iv) how do computer chess programs work, and why is it taking so long to make a computer program that can beat the best human chess players?	Collection of magazines and newspaper articles See Support Resource Listing in this TRM.	

MODULE 25: Personal Investigation

Prerequisite: All Mandatory Modules

This module provides students with the opportunity for a personal inquiry into an aspect of computer technology of their own choice.

Learner Expectations	Student Activities	Resources	Integrated Activities
1. Investigate an area of personal interest through independent planning, teacher-assisted planning, or selecting a topic from teacher prepared options (e.g., integration of the computer in the school).	The student will decide, in consultation with the teacher, on a long-term research assignment; the teacher and student will decide on an appropriate medium for presentation (e.g., videotape of computers in the science room, class presentation of a home computing project, demonstration of a program).		Language Arts: If the student chooses to write a research paper, evaluation and writing could be coordinated.
2. Present or demonstrate the results of the personal investigation.	These assignments should, ideally, be shared with the class in some way. Teachers should also consider making students' individual work part of the magazine and article collection.		Art: The final presentation of the research assignment will require artwork and presentation techniques.

Teacher Tips:

- Since students typically prefer working at the computer, it is an excellent idea to commit as much as you can of the research information you are going to use with students to word processor files or data bases. This gives the student valuable experience, and provides the teacher with a paper-free environment, as the data bases grow.
- A historical time line created by students as a word processor file has these advantages:
  - a) It can be expanded easily.
  - b) Information can be copied into the file neatly.
  - c) The teacher can create the skeleton for the time line.
- Once the time line is printed out, it is less flexible but:
  - a) It folds up neatly.
  - b) It can be embellished by pasting pictures onto the printout.
  - c) It fits into the student's notebook.
- Much of the material covered in this unit is current. This means that textbooks are not going to be a lot of use for some of the topics. The teacher will have to collect magazines, newspaper articles, pamphlets, posters and other media to get a source of research documents.

SAMPLE LESSON PLANS FOR EACH THEME

Note: Some materials in this section of the TRM are also available as Appleworks files on the TRM Data Disk.

Theme 1:	APPLICATIONS
Module 1:	Computer Operations
Learner Expectation:	2. Students will: a) demonstrate how a computer system operates by using a computer tutorial disk.

Teacher Preparation: Explain the purpose of a tutorial disk (e.g.," Apple Presents . . . Apple: Your Tour of the Apple IIgs").
Demonstrate startup procedure.
Students could be grouped in two or three if there is more than one kind of computer in the lab. This enables students to rotate and work with more than one kind of tutorial.

Student Preparation: Students refer to the computer manuals for an overview of expectations, startup and procedures (e.g., Apple IIe – Apple IIe Owner's Manual, pp. 30-41; Apple IIGS – Owner's Guide, pp. 8, 9).

Resources: Disks – Apple Presents . . . Apple: Your Tour of the Apple IIgs

Manuals – Apple IIe Owner's Manual; Apple IIgs Owner's Guide

Suggested Activities: Review reading assignment.
Boot the appropriate disk, follow instructions.
Exchange disk for another tutorial if available, repeat above.

Closure: Class discussion – how a computer system operates; similarities and differences of computer systems.

Evaluation: A student checklist could be used to indicate date and completion of each tutorial disk.

Post-Lesson Comments:

Theme 1:	APPLICATIONS
Module 5:	Desktop Publishing – Advanced
Learner Expectation:	2. Assess desktop publishing software and the multi-page document based on general and personal criteria.

Teacher Preparation:
Prepare and distribute evaluation checklist (see sample checklist on following pages).
Prepare a bulletin board display of multi-page documents.
Make available computer magazine reviews (see Learning Resources Section).

Student Preparation:
Obtain evaluation checklist.
Use personal samples of documents for evaluation of program.
Review computer magazine articles if available.
Obtain manual for the desktop publishing program used.

Resources:
Desktop publishing manual.
Document samples.
Available computer magazine review articles.

Suggested Activities:
Obtain all materials.
Review available computer magazine articles.
Compare documents produced.
Complete the evaluation checklist for desktop publishing.

Closure: Hand in the checklist for evaluation.

Evaluation: Point values will be determined as indicated on the checklist.

Post-Lesson Comments:

EVALUATION CHECKLIST FOR DESKTOP PUBLISHING

General Features

1. Name of program used:

____

2. Cost: least expensive (under $100.00); most expensive ($700.00 and up)

____

3. Minimum system requirement:
Memory: ____________________________________
Mouse: No: _____ Yes: _____ Optional: ____
Disk Drives: One ___ Two ___
Printer: ____________________________________
Monitor: ____________________________________

= =

Specific Desktop Publishing Features

	YES	NO
1. Undo (Can you change your mind, that is change the last action performed?)		
2. Manual (Rules are easy to find, understand)		
3. Kerning (Can distance between letters be changed?)		
4. Clip Art (Does the program include some?)		
5. Graphic Editor (Does this program include one?)		

= =

(Circle your choice)	Very Difficult				Very Easy
1. Easy to learn	1	2	3	4	5
2. Easy to use	1	2	3	4	5

= =

What do you think is the best feature? ______________________________

____

What do you think is the worst feature? ______________________________

____

____

____

DAILY LESSON PLAN FOR KEYBOARDING

Keyboarding—a module that focusses on skill development—benefits from carefully sequenced drill and practise. Develop a specific routine for your classroom so that best use is made of available class time. The most important activity is coaching individual students on the use of proper technique, so circulate when you are not teaching the group or pacing a drill.

The daily lesson content will vary according to the software package or keyboarding drill book you use for your lessons. However, the following components should be in each day's work.

1. Set up (disk booting, materials distribution).

2. A short warm-up (three to five minutes) serves as a review of the last lesson, allows students to limber up their hands, review previous keys and settle down ready for instruction. It also gives the instructor time to take attendance and attend to other daily routines.

3. Introduction of new keys (suggest two keys per day for three days, then a review day, allow lots of review; students like to be perfect). Introduction should include:

    - visual location of key on the keyboard
    - explanation of correct fingering
    - trial of correct fingering (allow students to watch their hands).

4. Drill on new key(s).

    - Emphasis should be on proper technique (while students practise, instructor should be continually circulating to monitor and reinforce proper technique on an individual basis).
    - Once students are comfortable with technique, alternate emphasis between speed and accuracy (e.g., Speed Drill: two 15-second timings on each single line of drill; goal is to improve speed over previous timing (e.g., Accuracy Drill: one 30-second timing on a group of skill lines several times and then moving on to a new group; goal is one error or less per timing).
    - As punctuation keys are introduced, appropriate use and spacing rules should be taught and recorded by students (see notes in resource column of keyboarding modules).

5. Individual practice from screen, hard copy or teacher directed. Make this "fun" occasionally.

6. Clean up and shut down work station.

Theme 1:	KEYBOARDING
Module 6:	Keyboarding – Introduction (Mandatory)
Learner Expectation:	2. Locate and properly use the alphabetic keys, space bar, shift keys and return key.

Teacher Preparation: Allow students to follow the routine of adjusting their work stations and beginning their warm-up from lines 1 to 4 of the sample drill copy that follows. There should be a demonstration station available so all students can watch the teacher demonstrate correct posture and reach to the new keys.

OR

Use overhead transparency of keyboard (see following page). Put your hands on the home row above the transparency and actually make the reach to the new key. Show the use of the appropriate anchor key (one finger always maintains its position over the appropriate home row key to ensure that you return to home row properly—with the reach to "i" the ";" key is anchored, and the other fingers can stretch off home row if necessary to facilitate the proper reach).

An example of students' copy for introducing the new letter "i" is illustrated on the following pages.

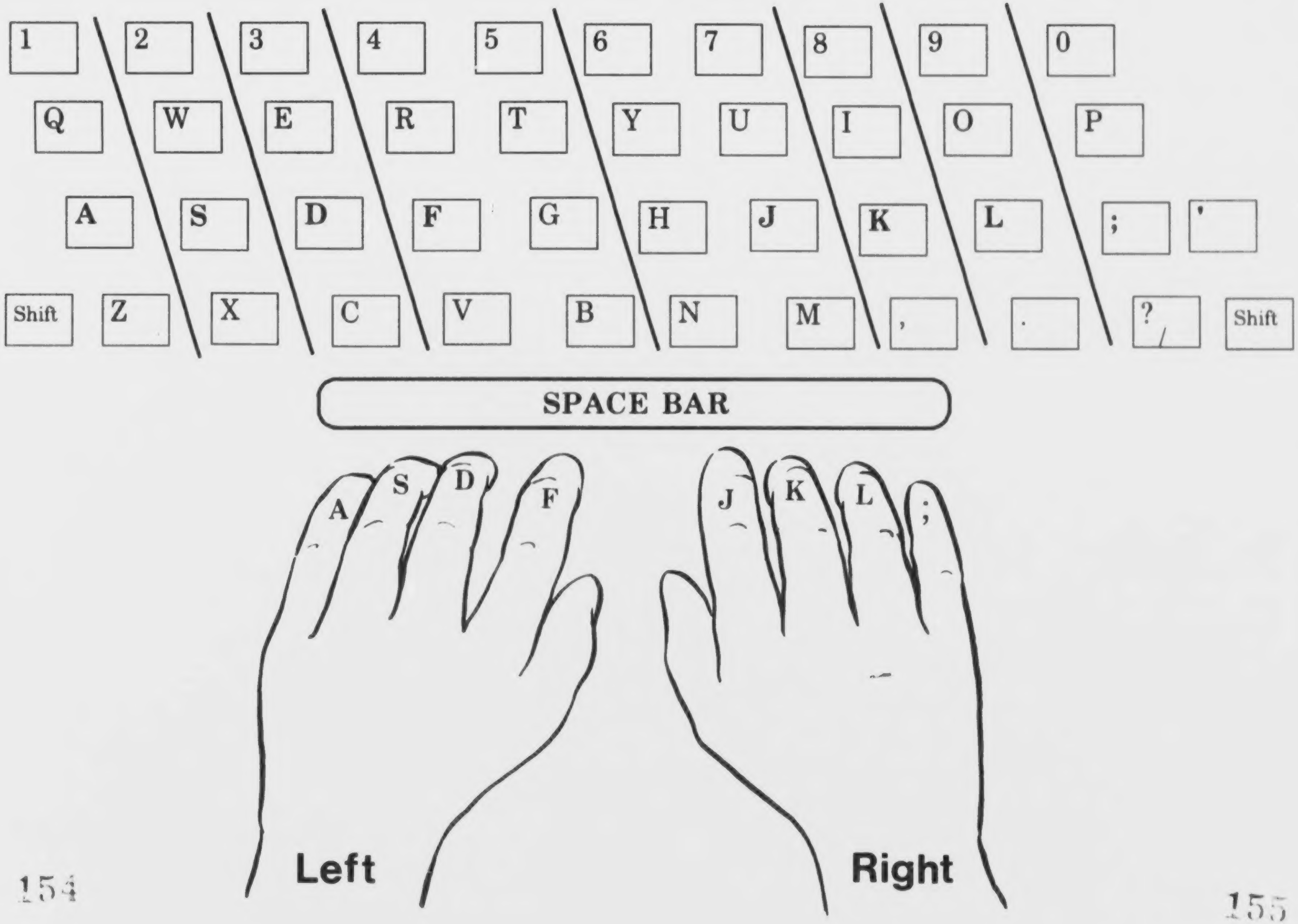
Say . . . "Put your fingers on home-row position. Now, while looking at your fingers and keyboard, reach with your "k" finger up to the letter "i". Back to the "k", up to the "i", back to the "k", try kik space, kik space. Do this about six times. Use your ";" finger as your anchor finger so that you do not lose the home-row position. Now, close your eyes and keep making this reach so you get the feel of where this key is located. Very good, now let's try line 5 from your sheet. Correct sitting position please. Ready, eyes on your copy . . . kkk space, kik space, kk space ki space . . . return, line five. Ready, eyes on your copy (and dictate the next line) . . ."

Usually there are two or three lines that introduce a new stroke. Dictate all lines of the new stroke practice. It is best to have students type each line twice, then double space and do the next line two times, etc.

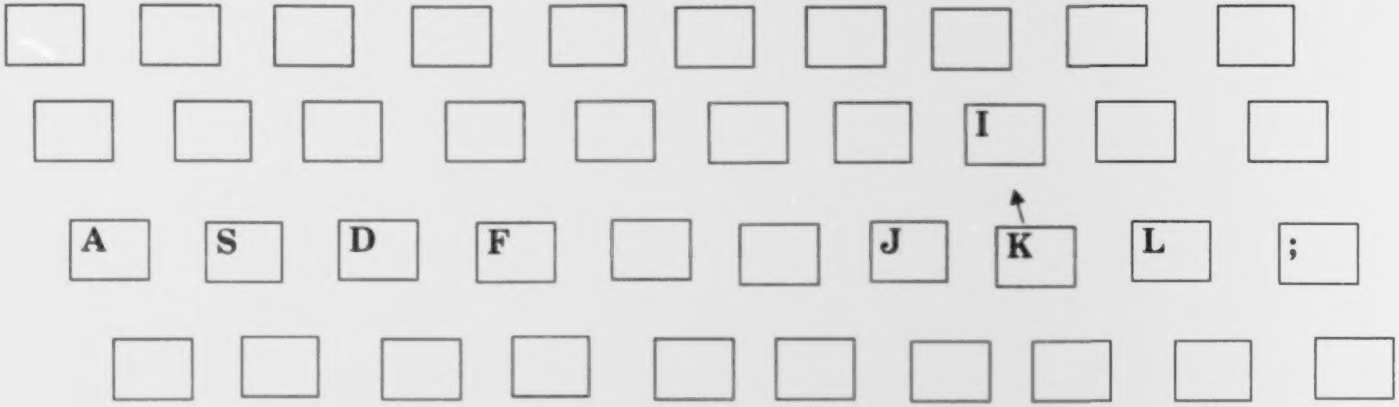
Allow students to practise on drill copy that includes the new letter integrated with the previously learned letters (lines 9 to 12 of the sample drill copy). Tell students to dictate lines silently to themselves; this helps them to concentrate better. While students are typing the drill lines, the teacher should circulate around the room and individually coach students regarding proper techniques.

Note: This "model" of a lesson is generally the format followed in most software packages. If you are using a textbook, simply follow the sequence of lesson outlines, with the appropriate review, learning and drill lines.

Correct Finger Position


1 2 3 4 5 6 7 8 9 0
Q W E R T Y U I O P
A S D F G H J K L ; '
Shift Z X C V B N M , . ? / Shift
SPACE BAR
A S D F
J K L ;
Left
Right

Sample Drill Copy



Warm-up Drill

1 jjj fff jf fj fjf lll ddd ld dl dld
2 kkk sss ks sk sks ;;; aaa ;a a; a;a
3 all fall lad fad dad ask sad lass ;
4 a lad falls; a sad asks; salad;

5 kkk kik kk ki ki kk ii kik kik kk i
6 kkk kik kk ki ki kk ii kik kik kk i
7 kik kik ki ki ik ik kiik kk iki iii
8 kik kik ki ki ik ik kiik kk iki iii

Drill on the I Key

9 kid did lid aid ski ail ill if kids
10 ill fill ail fail sails dials skill
11 if kids kiss; did dad dial; if skis
12 if a sail fails; if all disks fail;

-----------------------
1 2 3 4 5 6 7

Theme 1:	KEYBOARDING
Module 8:	Keyboarding – Extension
Learner Expectation:	4. Continue developing touch-typing skills, using both alphabetic and numeric keys.

Teacher Preparation: Time: 15 minutes. At this point in keyboarding, it is best to use short amounts of time per day to concentrate on skill maintenance and development, rather than lengthy sessions less often.

Provide copy from various sources for practising fluent keyboarding. Typing textbooks are perfect sources of copy. While students are typing, the teacher should circulate around the room and individually coach students regarding proper technique. Stress proper technique constantly . . . it is the best vehicle to improved performance.

Once students have begun to work the full keyboard, they may practise keyboarding by keying in notes and assignments from the subject areas.

ORDER OF PRESENTATION

No one order of presenting the keyboard has been agreed on by educators, and the text or program used in instruction will determine your approach to the sequence of instruction. Some of the different types are:

1. Horizontal—Students are first introduced to home-row keys. Then the upward reaches, the downward reaches and finally the number/symbol keys are covered. With this method, much of the drill will initially be "nonsense" words since there is a lack of vowels to use in the beginning stages.

2. Vertical—Students are introduced to the keyboard a "finger-at-a-time," beginning with the index fingers (f and j). After all reaches are covered with these fingers, the next finger over is taught, and so on. The main disadvantage is that more difficult reaches are covered before the more easily managed reaches (which tends to reduce learner confidence), and, again with the lack of vowels, "nonsense" words become the main drill content.

3. Skip-around—Students begin with the home-row keys and then follow a specifically planned sequence of new letters. Generally, textbooks or programs using this method attempt to balance left- and right-hand words, vowels, easy and more difficult strokes, and upward and downward reaches. This enables the learner to practise on meaningful words, and is the most widely used method of presentation.

Number practice can occur in one of three ways:

1. Home-row method—The reach from the home-row position to the top row for numbers is taught in the conventional manner of reach to number and return to "home" position. Best used when copy is a mixture of alphabetic and numeric.

Note: Some textbooks incorporate the numbers in with the keyboard initially; others cover the numbers after all alphabetic reaches are complete. Be sure to use a textbook that reflects your presentation plan.

2. Pipe-organ method—Both hands are placed on the top row (left hand on 1, 2, 3, 4; and right hand on 7, 8, 9, 0). Most useful when copy is straight numeric and you wish to use the QWERTY keyboard.

3. Ten-key number pad method—The right hand moves over to the number pad and the conventional ten-key finger position and stroking are used. (Thumb and pinkie are not used, "home" position is on 4, 5, 6 with up/down reaches similar to regular keyboarding.) Best used for straight numeric copy using the numeric keypad.

Posture

The following guidelines are provided to assist teachers in providing instruction.

- Front edge of the keyboard should be at front edge of desk.
- Centre of the body should be aligned to the B key.
- Head should be erect and facing copy or screen.
- Back straight with body leaning slightly forward; shoulders level, with elbows hanging naturally.
- Lower arm should be parallel to the floor (adjust chair and desk height).
- The wrists should be held level, no arch or dip; students should not rest the heel of their hands on the keyboard or desk.
- Palms cupped slightly (as though holding a grapefruit).
- Fingers curved; only the tops should lightly touch the keys.
- One thumb should be tucked up toward the palm, with the other gently resting on the space bar; ensure that students do not "hook" their thumbs under the keyboard.
- Correct distance to the keyboard can be determined by having students sitting as above — the curved fingers of the hands should naturally fall over home row (move closer to or farther from the keyboard to adjust).
- Feet comfortably apart, flat on the floor with one foot slightly ahead of the other. If possible, adjust the chair height to achieve this or provide a box to ensure feet don't "dangle."

Other Considerations

- Work space should be clear of books, jackets, etc.
- Continual review and reinforcement of keyboarding technique should occur, otherwise the skills will disappear after the formal instruction ceases.
- Screen should be kept clean and glare-free.

Evaluation

Keyboarding should be top priority for both the instructor and students in terms of importance. Without this base, computer input is inefficient and time wasting for students.

Speed and accuracy will develop out of good technique. Speed and accuracy will not develop into good technique.

The purposes for evaluation vary. Often we evaluate to motivate students, to find a basis for designing a program for a student, or to determine grouping. Many times evaluation is to determine the level of skill a student has attained before further instruction takes place or to ascertain where extra help might be needed. From a curricular standpoint, evaluation serves to determine if the objectives of the unit were achieved, and to provide a summative evaluation of technique and skills.

Most of the keyboarding time will be spent in introducing and practising the new alphabet and number key reaches. During this initial skill-development period, you should stress keyboarding technique more than speed and accuracy, and your evaluation system should reflect this emphasis. However, it is important to remember that keyboarding must be executed with a degree of accuracy and at a rate of speed that will make it profitable for students to use their touch-typing skills rather than the "hunt and peck" method.

Accuracy

A number of factors are involved in building, maintaining and improving accuracy. These should be heavily stressed during initial instruction, and reinforced continually. It is vital to seek accuracy as an essential criteria for acceptable performance, even though it is true that learners will make more inaccurate responses during their initial skill development. Remember, you are attempting to build a pattern of "correct response" to letters; if you take the "errors do not matter" approach, the skill will not develop. On the other hand, don't overemphasize accuracy (students tend to do this for themselves). It tends to make students interrupt the rhythm of their stroking to go back and fix a mistake. Charting errors is a more effective way of noting improvement.

Accuracy requires conscious effort, and it is important to keep the goal of accuracy before students throughout the learning of touch-typing skills. One of the easiest and most effective strategies for encouraging accuracy is to decrease the error tolerance allowed on timed writings. Another way of letting your students know the importance of accuracy is by asking for accuracy scores as often as speed scores when checking timed writing results—count accurate words or number of accurate lines instead of errors; or look for copy with fewer errors than previous try.

Speed

Keyboarding speed does not "come naturally," it comes only by intention and practice. It comes as a result of fast fingers; motionless wrists, arms and elbows; and continuous, steady keyboarding without pause. To develop speed, therefore, students should type patterned drills that encourage confidence and rapid finger movement. (Drill books contain sections of these "unbalanced hand words" and drill lines made up of short, easy words.)

Timed drills are useful to direct technique improvement and keyboard control. Early drills should be short timings on practised material, gradually moving to longer timings on unpractised material. Timed drills are useful only as a measurement of achievement—use them sparingly.

To provide the optimum opportunity for students to be successful, timed writings should be scheduled during the first half of the class period, on short, easy words (typing textbooks are good sources of these) for short periods of time, to minimize the adverse effects of fatigue.

Students should be encouraged to compete with themselves, not with others in the class. They should be encouraged to set goals for their own performance, evaluate each day's progress (mentally), and measure success on the basis of improvement.

Evaluation Strategies

One method of evaluation is recording technique performance based on the following point system:

5 – **Excellent Technique**
Good posture, eyes on copy or screen and fingering with minimal observable errors in technique.
4 – **Good Technique**
Eyes on copy or screen but an occasional error in one of the other techniques (e.g., posture, fingering, or fingers do not return to home row).
3 – **Satisfactory Technique**
Generally good performance but occasional errors in more than one technique.
2 – **Fair Technique**
Student has difficulty in keyboarding but is still trying. More practice is necessary for improvement.
1 – **Poor Technique**
Student has difficulty and makes little or no effort.

OR

A more specific evaluation could be accomplished by using the technique checklist on the following page. Simply place your students' names on the lines to the left, and evaluate each of the specific factors of technique on the five-point scale from Excellent–Good–Satisfactory–Needs Improvement–Poor.

Then you can grade students based on 25 possible "technique" points for keyboarding. Other components of the keyboarding module—performance and attitude—can be added to provide a grade for the module, in whatever weighting you choose.

OR

A more simple checklist like the one below could be used, and "weighted" as follows:

Good - 5
Satisfactory - 3
Needs Improvement - 1

In this way, technique becomes 25, and attitude 5 for a total of 30 marks for technique and attitude. This can be blended with a speed/accuracy evaluation for a keyboarding grade.

Keyboarding Technique Evaluation

Student's Name______________Grade______	G	S	NI
Keyboarding Technique Evaluation			
Eyes on copy ________			
Correct posture at the computer Body erect in chair ________			
Feet flat on the floor ________			
Correct finger and hand position ________			
Correct fingers used for keys ________			
Wrists kept level (no arch, no dip)________			

Comments ____

____

	G	S	NI
Attitude and Behaviour ________			
Comments ________			

G = Good	S = Satisfactory	NI = Needs Improvement

Keyboarding Evaluation Checklist

Class:____________________________ **Grade:**______________________

	Eyes on Copy					Body Erect					Feet Flat					Stroking					Wrists					Total
	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	

5-point scale: Excellent – Good – Satisfactory – Needs Improvement – Poor

Speed/Accuracy

Although evaluation of junior high school students should not be based on rigid standards, devices such as words-a-minute (w.a.m.) achieved in timed writings are helpful in setting goals and determining progress. They should not be the sole criteria used to measure success.

At the beginning of the school year the handwriting speed is determined by taking one or two 1-minute timings. Be sure to do this before you begin instructing on the keyboard, and attempt to ensure that students write at a "normal" speed—they will be tempted to race the clock. You will probably notice the average student in Grade 7 is handwriting at about 15 words per minute. Note how quickly they are able to "touch-type" faster than they can write.

To calculate words-a-minute (w.a.m.)

In keyboarding, one word = five characters (for consistency, handwriting speed should be measured the same way).

A character is any motion on the keyboard, including spaces and punctuation. Therefore, it is best to use timing copy that is marked off in five-character sections, and that has a standard number of characters per line; otherwise you would have to "count characters" to determine words typed. The preferred copy is an old typing textbook or drill book. Example:

Our big book sales will begin in February and stop 10
in September. Many of the books on sale will come 20
from our regular stock. However, extra books will 30
be brought in from a special bulk purchase. 39

. . . .1. . . .2. . . .3. . . .4. . . .5. . . .6. . . .7. . . .8. . . .9. . . .

To determine students' speed on this, simply set a timer or use a stopwatch to ensure they are keyboarding for EXACTLY one minute. (Obviously, if the time allowed for timings varies by even a few seconds, students' speed will be inconsistent and it may frustrate their efforts to improve.) The numbers to the right of the paragraph indicate how many words are typed to that point.

If a student typed to the word "However" on line three, he or she has typed two complete lines (20 words), and is working on the seventh word on the following line, so the speed is 27 words-a-minute.

Should you wish to time students for periods of time that are less or more than one minute, simply add all the words in the usual manner, and then multiply or divide the words typed to relate them to one minute (e.g., if students type for 30 seconds, multiply by two to get words-a-minute. If timing is two minutes, divide by two to get words-a-minute, and so on).

During the module, sample the keyboarding speed with several timed drills to determine at what speed the student is keyboarding.

A scale can be adopted that would compare a speed to a percentage grade. It should be remembered that accuracy is important, so copy that contains more than three errors per minute should not be acceptable. To encourage students to slow down and maintain accuracy, teachers would be justified in taking away up to 5 percent for each error over three in a one-minute timed writing. A typical scale may be found in a typing textbook.

Instructors can adopt a grading system that reflects individual progress. An example of this is:

Modules 6 and 7—Students should achieve handwritten w.a.m. (average about 15 w.a.m.) to get a 70 percent grade. Add 5 percent for each w.a.m. over handwriting speed; subtract 5 percent for each w.a.m. less than handwriting w.a.m.

Modules 8, 9 and 10—For Modules 8 and 9, students should equal their handwriting speed, and for Module 10, keyboard at double their handwriting speed to receive 75 percent. Again, add or subtract for differences from this average.

Errors

Errors in keyboarding are calculated as follows:

1. Count an error for each word that contains an incorrect character.
2. Count only one error against one word, no matter how many incorrect letters it may contain.
3. Count a word as an error if the punctuation or spacing after it is typed incorrectly.
4. Count each word that is omitted as an error, and remove it from number of words typed.
5. Count a word that is repeated (when it shouldn't be) as an error. (No extra words added to speed.)

Students should be asked to place a circle around all words that contain an error to ensure they have found them.

Instructor should have some record of progress on a weekly basis—at first only technique and work completed; after the third week, a combination of technique and speed/accuracy grades.

Teacher Tips

ROUTINE is extremely important in developing a skill. Even through the daily routine—warm-up, introduce new key (or review), skill build—does not change, actual classroom activities can be varied. Concentrate on and monitor keyboarding technique all the time, but vary emphasis on speed, accuracy or "game" situations to keep students interest up. Basically any and all practice that keeps students working on the keyboard with proper technique is good practice. Students respond to games, contests or any type of competitive situation. Use them wisely, however, and beware of quick response game situations where students use "two-finger typing" to gain speed in playing the game.

Software packages alone are not adequate for preparing students for keyboarding. They become boring, non-motivating activities for students after a very short time. They do NOT supply the meaningful teacher feedback required to establish the important techniques wanted.

A perfect source for drill copy and material for timed writings is a typing textbook — contact your local high school business education teacher for suggestions.

Initially, it is necessary for students to look at the keyboard and fingers in order to get a mental picture of where the keys are located. After the first few lessons, students should be encouraged to look at the copy or the screen, rather than at their hands.

Treat the copy produced during skill building exercises as practice material only and don't collect or grade it. This relieves tension and the fear of making errors.

Fatigue will hamper the development of both speed and accuracy, especially for beginning students. Vary the length of the drills. Spurt timings for speed growth should be for 12-second intervals. (This converts easily to speed—each stroke represents one word per minute.) Timings for accuracy should be thirty seconds or one minute in length.

During the introduction of each keyboard character, the teacher can control the stroking pace by orally dictating the sequence of each line; stroke by stroke, at approximately a stroke a second (12 w.a.m.). This procedure helps the student establish an efficient stroking rhythm while learning a new key. Do not continue this for over a line or two because each student should be free to develop his or her own pace and pattern. Efficient stroking is done in rhythmic patterns, not metronomically.

Devote part of each class to skill building drill, directed by the teacher. Be sure to allow for evaluation of progress, even if it is the students' self-assessments indicated by a show of hands. This allows the opportunity or direction for follow-up work.

To increase concentration and inhibit keywatching:

- type a drill line backwards letter-by-letter, or word-by-word
- type in a different language
- type the alphabet or a predetermined group of words with the lights out/monitors off/hands covered.

Use positive approach—praise those who do not watch their fingers instead of warning those who watch their hands.

One good method of dealing with (bi)weekly evaluation is to have students try a timed writing each day, proofread and "grade" the timing using a scale. Each day, students may trade the teacher for their previous timing if they have improved their score. At the end of the week, the teacher has only one timing to check and record, and students always feel that their best work is being graded.

A side benefit is that since students must "mark" their own papers and use their own judgment to decide whether to trade or not, it tends to make students proofread their copy more closely—a definite advantage to input operators.

Students can pace themselves by using a cassette tape on which the time intervals have been recorded. (Ready, start . . . 1/4 minute . . . 1/2 minute . . . 3/4 minute . . . 1 minute.)

Bulletin Board Suggestions

Inverted styrofoam hamburger containers fastened on a bulletin board make excellent reproductions of the computer keyboard keys, and can be custom designed to represent your particular computer. Mark the character on a small square of paper and attach it to the bottom of the appropriate key (hamburger container half). Use a variety of colours to indicate keys that are home row, left hand/right hand, or touched by a particular finger.

Have a "map" display, where students' "cars" can progress when posture is perfect, when speed improves, or errors lessen . . . you decide the criteria.

Put up a "wilted" flower and a "tall straight" flower with the question HOW IS YOUR POSTURE?

Have sections of the bulletin board designated for names of students who have typed "perfect" copy (LOOK MOM, NO ERRORS) or who have reached a certain speed (THE OVER 20 CLUB), etc.

Each student could have their own hot air balloon, jet or rocket on the bulletin board that asks HOW HIGH WILL YOU SOAR? The left of the bulletin board can be the "heights" (e.g., speed or accuracy).

A board entitled DON'T CLOWN AROUND, could show a clown holding balloons labelled with the various good typing techniques.

Display work under captions such as "Your good work is showing," "Happiness is . . .", etc.

Theme 3: PRODUCTIVITY

Module 11: Word Processing – Introduction (Mandatory)

Learner Expectation: 1. Demonstrate effective use of a word processor in the stages of the writing process.

Teacher Preparation: Briefly introduce through discussion, the three parts of the writing process. Students may already be familiar with the concept through their language arts class.

It may enhance the activity if topics are brainstormed before the activity is begun.

OR

Consult with subject area teachers to gather topics useful from an integration standpoint.

Student Preparation: Students should be familiar with the following tasks and concepts before beginning this activity:

- loading the AppleWorks program
- opening a new file (adding a file to the desktop)
- basic knowledge of processes of moving, deleting and copying text
- saving a file
- printing a file.

Resources: *MacMillan Computer Literacy*, Unit 3, pp. 116-126
Word processing software: **Microsoft Works, FrEd Writer, MouseWrite, LogoWriter Secondary, AppleWorks** or Multiscribe.

Suggested Activities: Completion time: three to four periods or longer, depending on required length of the document.

Note: These activities can be used as integration activities for any subject area depending on the chosen topic.

1. Teacher-directed discussion on the writing process. Include parts of the writing process, and how using the writing process skills can improve writing skills in all subject areas.
2. a) Read *MacMillan Computer Literacy*, Lesson 2, Prewriting, pp. 116-119, then complete lesson review questions 1-4, p. 119.
   b) Assign the following question to the students along with the above: What are the three main steps in prewriting?
   c) Use the word processor to complete the lesson review for question 7. Save the file using the name "PREWRITE".
3. a) Investigate procedures used in writing by reading *MacMillan Computer Literacy*, Lesson 3, Writing, pp. 120-122, then completing Lesson review questions 1-4, p. 122.
   b) Use the word processor to complete lesson review question 7. Save the file using the name "WRITE."

4 a) Investigate revision techniques by reading *MacMillan Computer Literacy*. Lesson 4, revising pp. 123-126, then completing lesson review questions 1-4, p. 126.

b) Use the word processor to complete lesson review question 7. Save the file using the name "POSTWRITE".

Closure: Students hand in printed copies of each of the activities for evaluation.

Evaluation: Has the student completed all portions of the activities?
Have the procedures involved in prewriting, writing and revising been followed?
Is the student working on the improvement of keyboarding skills?

Did the activities keep the student's interest?

The following is one possible evaluation tool for grading each activity done on the word processor.

NAME ______________ CLASS ________________ GRADE _________

Completion of the activity (corrections during revision, creativity).

Incomplete -------------------------- Complete
1 2 3 4 5 6 7

Use of prewriting, writing and revision techniques.

1 2 3

Proper keyboarding technique.

1 2 3 4 5

Total /15

Teacher Tips: Consult with other subject area teachers to gather ideas for the assignment.
Examples:
Language Arts: short stories, news articles.
Social Studies: paragraphs on historical events, cultures, current events, social issues (poverty).
Science: comparing man-made structures and designs with those found in nature.
Health: paragraphs on peer pressure, health risks (smoking, drug use).

Post-Lesson Comments:

Theme 3:	PRODUCTIVITY
Module 11:	Word Processing – Introduction (Mandatory)
Learner Expectation:	6. Understand and demonstrate the steps necessary to use the basic functions of a word processing package (create, store, retrieve, edit, print, list files, move/copy text, search/replace text).

Teacher Preparation: Introduce the lesson using overhead transparencies to demonstrate entering, moving and deleting text. An alternative to this presentation would include the information presented on the overheads in handout form. This would enable the activity to become more student-centred.

Student Preparation: Students should be familiar with the following tasks and concepts before beginning this activity:
Load the AppleWorks program.
Use the ESC, delete and Open Apple-?, H and Y keys.
Basic knowledge of processes of moving, deleting and copying text.

Resources: **AppleWorks, Microsoft Works, FrEdWriter, LogoWriter Secondary, MouseWrite**
ClassWorks–AppleWorks for the Classroom, Lesson 2.3, p. 27
Word processing reference sheet; ClassWorks, p. 103
ClassWorks Student Data Disk files: Fairy Tale, The Hole Truth and Fairy Tale, The Hole Truth and Fairy Tale II.

Suggested Activities: Completion time, one or two periods.

Note: These activities can be used as language arts integration activities as they give practice in spelling, grammar and punctuation correction.

1. Students identify the functions they will be using in this activity (open apple D, M, C), and are given the word processing reference sheet.
2. Students load the activity "Fairy Tale" from the disk, and work through the activity, moving and deleting text and creating their own end of the fairy tale. Students save the completed assignment on their own data disks.
3. Students load the Activity the "Hole Truth" from the disk and work through the activity using the copy function. Students save the completed assignment on their own data disks.
4. Students load the activity "Fairy Tale II" from the disk and work through the activity to give them further practice in using the delete and move text functions. Students save the completed assignment on their own data disks.

Closure: Students print out copies of each assignment to hand in for evaluation.

Evaluation: Has the student completed all portions of the activities?
Have the correct procedures been used in editing the activities?
Is the student working on the improvement of keyboarding skills?
Did the activities keep the student's interest?
Following is one suggested evaluation tool for grading each activity on the word processor.

- -

NAME ______________ CLASS _______________ GRADE ________

Completion of the activity (corrections during revision, creativity).

Incomplete - Very complete
1 2 3 4 5 6 7

Use of prewriting, writing and revision techniques.

1 2 3

Proper keyboarding technique.

1 2 3 4 5

Total /15

Teacher Tips: Word processing activities such as this one can easily be adapted to other word processing software. Programs such as Multiscribe and MouseWrite will read AppleWorks files directly from the Student Data Disk. The instructor can alter directions for the activity to suit the software being used.

Enrichment: Have students follow through the procedures and concepts of this lesson by choosing a song and entering the verses. For example, the chorus could be inserted using the block copy function and the move function could be used to scramble the order of the verses. A final task would have the students write an additional verse to the song they have chosen.

Post-Lesson Comments: This module provides the opportunity for students to explore the possibilities of controlling the computer by programming.

Prerequisite: Module 1: Computer Operations

Theme 4:	PROGRAMMING	
Module 16:	Programming – Introduction (Mandatory)	
Learner Expectation:	1.	Demonstrate understanding of computer programming in BASIC.

Teacher Preparation: Teacher may wish to prepare in advance any notes defining commands. These may be distributed before, during or after presentation of lesson.

Student Preparation: Students should know:
1) Use of commands HOME, NEW and PRINT
2) How to code simple programs.

Resources: *Introduction to BASIC*, pp. 42-43.

Suggested Activities: DEMONSTRATION – may be either a teacher demonstration or class exercise with students at computer and instructions given orally, or students may use Student Activity Sheets that follow.

Instructor might give students instructions for this lesson plan such as:

Make sure the CAPS LOCK key is down.
Type HOME and press the return key.

Type your name, first and last, but **do not** press the return key.
What do you see printed? [Name in light letters on dark background.] This is called normal mode, which the computer goes into automatically.

Press the return key.
What happened? [Syntax error message and "beep" sound.]

Why does the error message appear? [Because your name is not a command.]

PRINT CHR$(7) can be used to make the "beep" sound you just heard.

Type PRINT CHR$(7) and see what happens.

Type INVERSE and press the return key.

Type your name (first and last) but **do not** press return.
What do you see printed? [Name in dark letters on light background.]

[**stress:** Inverse command must go ahead of name.]

Press the return key.
What happened? [Syntax error message in inverse mode.]

Ignore the syntax error message.

Type NORMAL and press return key.
What happened? [Cursor returned to normal mode.]

Type FLASH and press return key.
What happened? [Cursor is now flashing on and off.]

Type your name (first and last) but **do not** press return.
What do you see printed? [Name flashing on and off.]

[**stress**: FLASH command must go ahead of name.]

Press the return key.
What happened? [Syntax error message flashing on and off.]

Ignore the syntax error message.

Type NORMAL and press return key.
What happened? [Cursor returns to normal.]

Review: Print modes NORMAL, INVERSE and FLASH.

Assignment:

1) Print name of a brother, sister or parent in INVERSE mode.
2) Print name of a friend in FLASH mode.

Assignment:

1) Code, enter and save a program that prints your full name. Your first name is to be in inverse mode, your middle name in normal mode, and your last name in flash mode.

2) Modify program in question 1 so that computer will make a "beeping" sound after it prints each part of your name.

Closure: Students submit completed assignments for marking.

Evaluation: Evaluation of student programs should take into account the following:

1) Completed program:
   Does it work? Then it gets a mark.
   Does it work with some inaccuracies/awkwardness? Then take away marks.
   Does it work with additional sophistication? Then add marks.
2) Documentation: Flow charts and/or coding sheets if applicable. Give allotted marks.

Example:	Total mark 10
Works:	5
Works with some inaccuracies/awkwardness:	-2 (Max)
Works with additional sophistication:	+1 (Max)
Documentation (flow charts and/or coding sheets):	4
	10

The total mark for each program may vary depending on the difficulty of each program and the judgment of each teacher.

Elective Suggestions:	Have students prepare a sign for an upcoming event in normal mode, with parts of sign in inverse mode, or parts in flash mode, or both for emphasis.
Teacher Tips:	Lesson may also be handled by using worksheets (see Student Activity Sheets) with questions to be completed at computer. Worksheet could be used after discussion or after presentation of notes.
Post-Lesson Comments:	

STUDENT ACTIVITY SHEETS
(Programming Lesson – Module 16)

Make sure that **CAPS LOCK** key is down.

Type: Your name (first and last) but **do not** press return key.
What do you see printed and how is it printed?

____

____

Note: What you see printed is called the normal mode, which the computer goes into automatically.

Press return key.

What happened?________________________________

____

Why does the error message appear?______________

____

____

Note: PRINT CHR$ (7) can be used to make the "beep" sound you just heard.

Type: INVERSE and press return key.

Type: Your name (first and last) but **do not** press return key.

What do you see printed and how was it printed?__________

____

Note: INVERSE command **must** go ahead of name.

Press return key.

What happened?________________________________

____

Type: NORMAL and press return key.

What happened?________________________________

____

Type: FLASH and press return key.

What happened?________________________________

____

Type: Your name (first and last) but **do not** press return key.

What do you see printed and how was it printed?______________________

____

Note: FLASH command **must** go ahead of name.

Press return key.

What happened?____

____

Ignore syntax error message.

Type: NORMAL and press return key.

What happened?____

____

REMINDER: Commands NORMAL, INVERSE and FLASH must be ahead of whatever you want printed.

Assignment:

1. **Print the name of a brother, sister or parent in INVERSE mode.**
2. **Print the name of a friend in FLASH mode.**
3. **Code, enter and save a program that prints your full name. Your first name is to be in inverse mode, your middle name in normal mode and your last name in flash mode.**
4. **Modify program in Question 3 so that computer will make a "beeping" sound after it prints each part of your name (remember PRINT CHR$ (7)).**

Theme 4: **PROGRAMMING**

Module 17: Programming Extension

Learner Expectation:
1. Program increasingly complex routines in BASIC by:
   a) using programming vocabulary (GOSUB/RETURN, READ/DATA,FOR-NEXT with both positive and negative steps, timing loops, numeric/string variables, INPUT, LET, IF/THEN).

Teacher Preparation: Prepare copy of activities for distribution to each student. Check possibility of further assignments from *Introduction to BASIC*, pp. 297-298.

Student Preparation: Knowledge of coding, entering and saving programs. Counting using positive and negative numbers (Integers).

Resources: *Introduction to BASIC*, pp. 286–296.

Student Activities: See Student Activity Sheets that follow.

Closure: Completed assignments handed in for marking.

Evaluation: Evaluation of student programs should take into account the following:

1) Completed program:
   Does it work with FOR-NEXT loops? Then it gets a mark.
   Does it work with some inaccuracies/awkwardness? Then take away marks.
   Does it work with additional sophistication? Then add marks.
2) Documentation (flow charts and/or coding sheets if applicable). Give allotted marks.

Example: Total mark 10

Works:	5
Works with some inaccuracies/awkwardness:	−2 (Max)
Works with additional sophistication:	+1 (Max)
Documentation (flow charts and/or coding sheets):	4
	10

The total mark for each program may vary depending on the difficulty of each program and the judgment of each teacher.

Elective Suggestions: Combine printing words and phrases a specific number of times, kinds of print and timing loops (e.g., prepare as sign with part of it repeated several times, part of it flashing, part of it in inverse print, with delay loops between each part).

Teacher Tips: Students may work through the lesson entirely on their own, or you may want to stop the class at certain points and discuss or emphasize points. Change instructions on exercises to suit your own procedures in class if "code, enter and save" are not your normal procedures.

Post-Lesson Comments:

STUDENT ACTIVITY SHEETS
(Programming - Extension, Module 17)

Enter and run the following program.

```
NEW
10 HOME: REM——COUNTING OR DELAY LOOP——
20 PRINT "HI"
30 PRINT CHR$ (7)
40 PRINT "THERE"
```

What happened?____

____

Add the following line to the above program and run.

```
25 FOR C = 1 TO 100:NEXT C
```

Now what happened?____

____

Line 25 caused the computer to pause, count to 100, then make a "beep" sound before printing the word **there**.

Next: enter and run the following program.

```
NEW
10 HOME: REM——COUNTING——
20 FOR I = 0 TO 20
30 PRINT I
40 NEXT I
```

What happened?____

____

Change line 20 to read: FOR I = 0 TO 20 STEP 5
Run program again.

Now what happened?____

____

Change line 20 to each of the following and run.

1) FOR C = -10 TO 10
2) FOR C = -10 TO 10 STEP 2
3) FOR C = 1.6 TO 29.8 STEP 6
4) FOR C = 20 TO 0 STEP -1
5) FOR C = 10 TO -40 STEP -5

FOR-NEXT loops can be used to have the computer count forward (positive step) or backward (negative step).

DEFINITION: FOR-NEXT loops - are part of a program that is repeated over and over as many times as determined by the FOR statement.

FOR-NEXT loops can also be used to print words or phrases over and over.

Enter and run the following program.

```
10 HOME: REM——PRINTING OVER AND OVER——
20 FOR P = 1 TO 5
30 PRINT "HI THERE"
40 NEXT P
```

What happened?____

____

Change line 20 in above program to: FOR P = 1 TO 20.

What happened?____

____

Note: The FOR statement determines the number of times the printing will take place.

Assignment:
Use FOR-NEXT loops to complete the following:

1) Code, enter and save a program that will have the computer count by four's from zero to 100.
2) Change and save program in question 1 to count down from 100 to zero by four's.
3) Code, enter and save a program that will record the final 10 seconds of a rocket firing. Have it print "blast off" instead of zero.
4) Code, enter and save a program that will print your first name 18 times.
5) Code, enter and save a program that will print your first, middle and last names with a time delay between each name.

Theme 5:	SOCIETY
Module 21:	Societal Issues – Introduction (Mandatory)
Learner Expectation:	3. Analyze the need for the protection of privacy regarding storage of personal data by researching human rights issues (e.g., privacy of the individual, freedom of information).

Teacher Preparation: The teacher should be familiar with the story provided with this lesson plan. The story can be modified, expanded, improved, in any fashion required.

Student Preparation: This exercise is most effective after a short introductory discussion of privacy issues, in particular access to information about other persons.

Resources: The students should have access to a short story similar to "Eldon and the Hamburger Heaven Tragedy," and the questionnaire that goes with the story. The TRM companion disk "TRM Data Disk" has this activity. Have the students complete this activity on the computer and print out their answers.

Suggested Activities:

1. Students read the story.
2. Students answer the questions following the story.
3. A group discussion follows.

Closure: Students should leave this class aware that there is no "end" to this story. Vigilance will be necessary to prevent erosion of personal privacy by increasing access to data bases. To a large extent, individuals have little control. Some possible considerations for "data-proofing" are:

1. Avoid providing any more information than required by law when filling out forms.
2. Find out what information data bases such as credit bureaus, schools, banks have in your file.
3. Given that it is harder and harder to keep a secret about yourself, it may be wise to avoid having negative items entered into data bases.

Evaluation:

1. The student's answers to the questions should provide some clue as to how much interest and attention the lesson created.
2. Evaluate the student's participation in the group discussion.

Post-Lesson Comments:

Eldon and the Hamburger Heaven Tragedy

Before you begin this story, you should realize that it couldn't happen today. Student records are not kept on computer data bases that anyone in Canada can access. Not yet, anyway. All kinds of computer files are, however, kept on grown-ups like your parents. As you read this story, think about that. This story could happen sooner in the future than you think!

Let's meet Eldon, a student attending Wildrose Junior High School, located in beautiful Cranberry Creek overlooking the Alberta prairies. Eldon's family has just moved to Alberta from Ontario. Eldon is a good hockey player, a mediocre student (although all of his teachers say that he could do better if he tried) and is growing out from under the chip he had on his shoulder as a kid.

Eldon is typical in one more way. He likes money. Eldon's dad had told him that he could have a motorbike if he could save up half of the money, so Eldon wants $300 badly. Like so many other kids, Eldon looked to Hamburger Heaven, the local fast food restaurant for a job. Eldon was pretty confident that he could get a job there. He is a hard worker (out of school, of course) and is responsible with money.

The interview with the manager really went well, the day that Eldon applied for the job. The manager told Eldon he liked this attitude, and the job was as good as his. Eldon went home floating on air. He could feel and hear the motorbike under him already.

That evening the phone rang. Eldon's Mom called him to the phone, saying that the manager of Hamburger Heaven wanted to talk to him. Eldon's mother looked impressed, and Eldon picked up the phone with joy.

"Eldon? Mr. Jones here. I've done some checking on things here on my office computer, and I find that you were in a lot of school fights in Grade 6. I'm sorry, but that's not really the sort of employee we're looking for. I've had to give the job to someone else." Mr. Jones hung up and Eldon turned away, his hopes shattered.

Questions

Forget, for a minute, that Mr. Jones was being unfair. Maybe he had a point and maybe he didn't. After all, if he makes a mistake hiring somebody, his job might be on the line. Here are some other things to think about.

To answer the questions, just type in your answers and use the down-arrow to move from question to question. The questions below will move to make room for your answer.

1. How do you think Mr. Jones might have got the information? Do you think he could have access to the same information in real life, today? How would he obtain the information in that case?
2. Did he have the right to have that information?
3. Do you think that Eldon might still get in a lot of fights, or might he have outgrown that problem?
4. How can information about you follow you around from province to province?
5. How can computers make it easier for people to obtain information about you?
6. Suppose Eldon had a record for shoplifting in Grade 6. Would that make any difference?
7. Laws are set up to protect kids, because they are young and make mistakes. Computer records are a lot less forgiving for grown-ups. Do you think that Mr. Jones would have a right to know that a young man who applied for a job had a shoplifting record in Grade 6?
8. How long should schools be able to keep computer records on students? If you think there should be a time limit, how did you decide on the length?
9. Records kept on computer are a little different than records kept in folders, because information goes from place to place on telephone lines, and it's not so easy to control who gets what information. Who do you think should be able to get information about your school records?
10. Who do you think has a right to see whether someone has a criminal record? Who has a right to see someone's credit record? Do you think people have a right to see their own records? Do you have a right to see the records that the school is keeping on you? Do your parents?

When you finish this set of questions, type your name on the bottom, save your file and print it out. Your teacher may want to have a discussion about all of your answers before you get into the group discussion.

Theme 5: SOCIETY

Module 21: Societal Issues – Introduction (Mandatory)

Learner Expectation:
4. Understand the ethical use of computers by:
   a) demonstrating awareness of present copyright laws
   b) recognizing practices that are an infringement of present copyright laws.

Teacher Preparation:

1. Find out as much as possible about Canada's Copyright Act and Bill C–60, which amended the Act.
2. Obtain from the students as much information as possible about local BBS systems that engage in piracy, as well as finding out about what sort of disk swapping, etc., is going on among their friends.

Student Preparation: Although this is mentioned in the activity, the point should be made at the outset that artists, software distributors, etc., are selling only the object purchased, not the intellectual component, and that the law is there to ensure that the creators of the material get proper financial rewards for their creative efforts.

Discuss what the students feel they have bought when they buy a record or disk. Do they feel that the creator owns any part of that disk?

Resources: Students should have access to a questionnaire similar to the one included on disk and in the Appendix.

Suggested Activities:

1. Students will complete and print out the questionnaire.
2. Students will discuss their answers in a group. It is often enough to have the students read their answers out loud to start a discussion.
3. Allow one class period for this lesson.

Closure: Re-emphasize what copyright is: the creator retains rights to the intellectual component and sells only the medium, which the purchaser can use only for himself or lend or give as a gift but not make a copy.

Evaluation:

1. Evaluate the quality of the answers to the questionnaire.
2. Evaluate participation in the group discussion.

Post-Lesson Comments:

What's Copyright All About?

Before you begin to answer the questions that follow, let's review what Canada's copyright law and Bill C-60, which amended the law, is supposed to do for us.

People who make and sell videos, records, cassettes, laserdiscs and computer programs all have one thing in common. They want to make a living at it (and even get rich, if they are good enough at what they do). They all have a major problem, however. Piracy. Theft. People steal their stuff, sometimes without even realizing that they are stealing.

Let's see how that works. Say you've bought a record of your favourite artist. Most people think that that's the end of the story. You own everything about that record, right? Wrong. The artist still owns his or her music. All you bought is that record. You don't have any right to copy the music onto a cassette, to charge money to listen to the music, or do anything with the music except listen to the record for your own enjoyment. The artist still owns the music that's on the record. Why do we have laws like that? Think about it. How much money could Glass Tiger make if all they ever sold was one album, and then everybody ripped off a cassette? You've got it. No more Glass Tiger.

Unfortunately that's exactly what's happening. People are stealing from artists, musicians and computer programmers. Often, the people doing it think of cute names for it, like piracy, or making bootleg tapes, or cracking or hacking. No matter what they call it, though, it's theft. The thing about that sort of theft is that people can make excuses like: "How can I be stealing anything when I taped my friend's record? After all, he still has the record!"

The worst offenders are often computer software thieves. Often whole bulletin board systems (BBS) are set up to let users copy stolen programs (the "pirates" like to call them "cracked", not stolen). Even more common is the practice of letting a friend copy a program. Every time that happens, someone is getting the benefit of the programmer's hard work and thought, without paying him anything for it.

It doesn't hurt only the programmers, musicians and videomakers, though. Eventually, when they are burned often enough, the makers either quit making quality stuff for the "pirates" to steal, or else they start charging really high prices so that they can make a little money before everybody has a stolen copy of the program, record or videotape. The quality of the product gets watered down, too. Think about this: how many really good songs are there on an album? Usually one or two hits, and the rest are OK, but you wouldn't buy the album just to hear them, right?

Enough about that. The questions that follow this explanation will ask you to make some decisions about things we might do every day. There will be a group discussion at the end of the exercise. Please think about your answers.

Questions

Try to guess whether each of these items is legal in Canada and give it a rating from 1 to 10 on how bad you think it is (10 is really bad). Also, tell who you think is being hurt by the practice.

1. Making a tape of a record and playing it instead of the record, so you can save the record.
   Legal? Rating? ___________
   Whom does it hurt? ________________________

2. Making a tape of a record and using it in your car.
   Legal? Rating?___________
   Whom does it hurt? ________________________

3. Making a tape of a record and giving it away.
   Legal? Rating?___________
   Whom does it hurt? ________________________

4. Making a tape of a record and selling it.
   Legal? Rating?___________
   Whom does it hurt? ________________________

5. Taping a song off the radio for yourself.
   Legal? Rating?___________
   Whom does it hurt? ________________________

6. Taping a song off the radio and selling it.
   Legal? Rating?___________
   Whom does it hurt? ________________________

7. Photocopying Christmas carols for the church choir?
   Legal? Rating?___________
   Whom does it hurt? ________________________

8. Getting records out of the library and taping them.
   Legal? Rating?___________
   Whom does it hurt? ________________________

9. Renting a video and charging to watch.
   Legal? Rating?___________
   Whom does it hurt? ________________________

10. Renting a video and making a copy for yourself.
    Legal? Rating? ___________
    Whom does it hurt? ________________________

11. Making a backup computer disk even though the company says you can't.
Legal? Rating? ___________
Whom does it hurt? ______________________

12. Making copies of your disk for friends.
Legal? Rating? ___________
Whom does it hurt? ______________________

13. Making copies of your disk and selling them.
Legal? Rating? ___________
Whom does it hurt? ______________________

14. Trading original disks of computer programs.
Legal? Rating? ___________
Whom does it hurt? ______________________

15. Downloading a cracked program from a BBS.
Legal? Rating? ___________
Whom does it hurt? ______________________

16. Uploading a program you bought to a BBS.
Legal? Rating? ___________
Whom does it hurt? ______________________

17. Copying a friend's new video.
Legal? Rating? ___________
Whom does it hurt? ______________________

18. Copying a video your friend taped off the air.
Legal? Rating? ___________
Whom does it hurt? ______________________

19. Copying character sheets from D&D game.
Legal? Rating? ___________
Whom does it hurt? ______________________

20. Copying a game your classmate wrote without asking.
Legal? Rating? ___________
Whom does it hurt? ______________________

Now you're ready . . . How do you think your answers compare?

Copyright Lesson Key

1. Not Legal
2. Not Legal
3. Not Legal
4. Not Legal
5. Not Legal
6. Not Legal
7. Not Legal
8. Not Legal
9. Not Legal
10. Not Legal
11. Legal
12. Not Legal
13. Not Legal
14. Legal
15. Not Legal
16. Not Legal
17. Not Legal
18. Not Legal
19. Not Legal
20. Not Legal

Who does it hurt?

Students more than likely will identify the artists, producer, retailer as the victim in all cases of copyright infringement. Further discussion should continue to show that the consumer really is the victim because of increased costs passed on to the consumer by the above—due to lost sales/revenue.

FACILITIES, HARDWARE, SOFTWARE

Budget Considerations for a School Computer Facility

The budget considerations for operating a computer facility in a school fall into four main categories. Each of these will be considered in some detail.

The four categories are:
1. Hardware acquisition
2. Software acquisition and maintenance
3. Maintenance of equipment
4. Replacement of equipment.

Hardware Acquisition

1. Once the type of equipment required in the school has been determined, consideration should be given to the following possibilities:
   a) Is there provincial or district funding available?
   b) In a new school or facility, can the equipment be funded as a part of the capital costs?
   c) If equipment is being upgraded, is there any arrangement provided for upgrades by the manufacturer?

Software Acquisition

1. Some of this has been done by Alberta Education; these programs have received either basic or support status. Other software to be used in the classroom should be examined by local school boards or individual teachers.
2. Teachers should be aware that, normally, acquisition of a piece of software entitles them to load that software into only one computer.
3. If the software is needed on many computers at the same time, it should be purchased with one of the following provisions:
   a) A site licence – these are provided by the distributor of the software. Duplication rights vary, and the terms should be understood before purchase (e.g., Scholastic).
   b) A district licence – often software manufacturers are willing to enter into a licensing agreement with a district (e.g., MECC).
   c) A direct agreement with the software manufacturer by letter or phone will often provide an economical alternative (e.g., Beagle Brothers).
4. Make note of the upgrade policy for software purchased. Upgrade provisions vary widely, from automatic, free updates for registered software as improved versions become available, to no update provision at all.
5. Almost inevitably, disk problems will arise. The purchaser of any software should be sure that the software provides acceptable rights to make backup disk, or that an acceptable replacement policy exists. Original disk should be locked away in a safe location as archival copies.

Hardware Maintenance

Make yourself aware of your district's policies regarding the following, as they have a direct bearing on the successful operation of a computer facility.

1. Service Contracts – these are useful only if the number of service calls during a year is fairly large. Otherwise the cost of the contract might be greater than the service requirements for the school.
2. Regular Maintenance of equipment is vital. It is important to decide what maintenance is within the capabilities of the teacher, and what maintenance is to be done by outside technicians. This is a necessary budget item, and should not be neglected, even though it is tempting to do so while the equipment is working well.

Hardware Replacement

Make yourself aware of your district's policies on hardware replacement.

What is the plan for replacement of equipment? Computers may become inadequate for program needs. Printers and other peripheral equipment will wear out.

- It should be clear over how many years the cost of the computers is amortized, to avoid the assumption that the initial purchase of computers was a one-time expense.
- There should be a clear understanding of how replacement costs will be met, whether by a regular setting–aside of part of the yearly budget, or by a major commitment of funds over one or two years.

Designing and Planning a School Computer Facility

Planning a computer facility requires careful consideration of individual school needs and consultation with the administration of the school. There are two main schools of thought concerning how computers should be distributed in schools. The first would have the computers all **located in a central resource centre**. The second would have the computers **located in classrooms**. It is not our purpose here to resolve this issue. Please see the footnotes for sources of information about both of these approaches.

Given that a decision has been reached within the school, planning should take into consideration the following:

1. Ideally, each student should have access to a computer.
2. The computers should be arranged in such a way that:
   a) location of work stations supports both student and teacher activities
   b) if speaking and note taking are going to be common, provision for a common orientation to the instructor should be made
   c) location of computers should provide for sight lines long enough for visual relief from extended focusing on the screen. Computers should not be placed so that a student directly faces a wall within 760–1000 mm
   d) for suggested sketches of computer laboratories, consult *Planning and Design of Computer Facilities*, published by Alberta Education.
3. Tables should have provision for a work space for books, etc., and should be of such a height that students can type with their arms level. Most classroom tables are not adequate, because keyboards placed on them cause students to reach up to the keyboard, causing fatigue. The suggested height is in the range of 740–790 mm. (*Planning and Design of Computer Facilities*)
4. If it is impossible to provide tables of a proper height, consider providing adjustable chairs.
5. Lighting in the room should be of low enough intensity that the monitors do not need to be operated at maximum brightness. This reduces eye fatigue, as does ensuring that windows and lights are not reflected in the monitor: 400–700 lux are recommended. Indirect lighting should be considered.
6. Networking the computers in a room greatly simplifies the loading and saving of files, along with reducing the number of damaged and lost files. If the computers operate as stand-alone machines, considerable thought should be given to storage and distribution of disk lest these vital housekeeping tasks come to take up too much time.
7. Care must be taken with power cords, which should not be allowed to run unprotected on the floor. If some computer stations are in the middle of the room, power should be run to them in a safe manner. Raceways may be run along the floor, in the walls or in the ceiling. If the room houses a number of computers, a keyed master power switch that is inaccessible to students should be provided.
8. In modernizing a room for computer use, provision should be made for a direct phoneline to the room, to allow for installation of a modem for telecommunications.
9. Although it is preferable not to have carpets in a room used for computers because of static electricity, if rugs must be included, it should be noted that low-static rugs are available, that static discharge mats should be provided, and students should be trained to use them. If the building is under construction, consideration should be given to

methods for humidity control such as using vapor barriers and sealant paints for the lab.

10. The following security provisions should be noted:
    a) an alarm system should be installed
    b) window screens should be installed on ground floor windows
    c) equipment should be attached to the furniture
    d) storage for software should be fire and waterproof
    e) consider storing backup software off the site.

Much valuable planning information, particularly suggested floor plans, can be obtained from the following sources:

Alberta Education: *Planning and Designing School Computers Facilities*, 1985.

Technology in Education Committee of the American Federation of Information Processing Societies,
    rev. 1988: *Planning for Computers in Education. A Resource Handbook.*

Information on the Apple Center for Innovation at Malmo School in Edmonton can be obtained in *Transitions: Proceedings of the AMTEC '89 Conference* by writing to:

Society for Instructional Technology - Edmonton
c/o Dr. Ray Schmidt
Strathcona County
2001 Sherwood Drive
Sherwood Park, Alberta
T8A 3W7

Hardware Selection Criteria

Hardware selection should begin with consideration for the school's long-term plans for the integration of technology in the classroom. A committee of interested staff members can be organized to determine the needs of the school and establish a priority list of computer specifications to meet those needs. An administrator should be an ad hoc member of this committee.

During the selection process, it is advisable to collect as much information as possible on this rapidly changing technology. Some of the best sources are hardware review articles in current periodicals (e.g., *Electronic Learning, Personal Computers K-12: A Guide to Help You Make the Right Choice*, March 1989). The more current the article the more valuable the information. A complete list of recommended periodicals can be found in the Program Support Resources section of this TRM. Other good sources of information include existing computer facilities and sales staff at the local computer store.

The following annotated list is provided as a basis for the analysis of available hardware. The list is comprehensive, although you may find that the hardware selection committee may provide additional criteria.

Memory

The amount of memory required will be determined by the software being used. Most software requires between 64K and 128K. Be careful not to underestimate your memory needs and be sure that the memory in the system is expandable.

Floppy Disk Drives

Most software will function with a single floppy disk drive. Floppy drives by design use either 5¼" or 3½" disks. The more compact 3½" disks have greater storage capacity and are becoming the popular choice. It would be advisable during the transition period to have a computer system operating with both sizes of drives so that data can be transferred from one disk size to the other.

Hard Disk Drives

Are comparatively more expensive than floppy drives and offer increased storage capabilities and access speed. This kind of storage system is commonly used on computer networks with shared access between computer systems on the network.

Monitors

Are either monochrome or colour. The software you choose will determine whether the more expensive colour monitor is warranted. If you choose a colour monitor it will most likely be for use with graphics software. You will also want to ensure that it is going to work as well for text display and does not cause eye strain. Display width is commonly 80 columns of characters across the screen for textual display.

Keyboard

Should be the same size and touch as a regular typewriter keyboard. Be sure that the distance between the keys is an appropriate reach for your junior high students. A number pad and function keys are added features you may want to consider.

Sound

Volume and an on/off control of sound is a particularly important system feature for a classroom setting. A headphone/external speaker outlet can also be a bonus.

Upgrades

A computer system must be upgradable/expandable to accommodate changes in software, internal hardware and peripherals.

Portability

May or may not be a concern as determined by the use of the computer within the school and beyond. A portable system is designed to be more durable, and can be conveniently taken home by teachers, parents or students for home study.

Financial Considerations

Cost will be a very important factor but should not determine the system you choose. Other considerations should include warranty, dependability and convenient quick service to reduce down time.

Printers

There are as many types of printers as there are computers. The type of printer you need is determined by the quality of output your work requires. The following is a very brief description of the main types of printers and their output capabilities.

Dot Matrix – capable of printing both graphic and textual documents, usually with a variety of type styles and sizes. The textual documents are not letter quality, as each character is created by a collection of small dots (hence the term dot matrix). Some of the more recent dot matrix printers are able to produce Near Letter Quality (NLQ). Colour printing capabilities are also available on some dot matrix printers.

Letter Quality – also called daisy wheel printers, are much like typewriters, with each letter a die-struck image. They are usually quite slow and noisy but produce excellent copy of textual documents. The print heads are interchangeable to allow for various type styles and sizes.

Ink Jet – are capable of printing dot matrix style type and graphics in a variety of type styles and sizes. Colour printing capabilities are also available on some ink jet printers. They are generally faster and quieter than dot matrix printers but also more expensive.

Laser – are much like photocopies in that the image is electronically printed using dry toner. They are capable of printing both textual and graphic images at very high resolutions.

Modems

Are communications devices that connect your computer with another computer through a phoneline. The term modem originates from Modulate/Demodulate. This is the process whereby the digital signals of your computer are converted into audio signals for the phoneline and vice versa. In this way, information can be shared between computers. Modems can be internal or external to the computers. Internal modems will be specifically designed for your computer while external modems will require an interface card. Modems transmit data in bits per second (bps). This is referred to as the baud rate. Baud rates for computers are commonly 300, 1200 and 2400 baud. Along with the modem you will need communications software and a phoneline. For more information on telecommunications, contact your local computer store and/or obtain the *Telecommunications Planning Guide for Educators,* McGraw Hill Information Exchange, 1988, (612) 829-8200.

Much valuable planning information can be obtained from the reference materials listed below.

Computers, Curriculum and Whole Class Instruction, Betty Collis, Wadsworth Publishing Co., 1988.

Planning for Computers in Education, A Resource Handbook, Technology in Education Committee of the American Federation of Information Processing Societies, Revised 1988.

Telecommunications Planning Guide for Educators, McGraw Hill Information Exchange, 1988 (612) 829-8200.

Planning and Designing School Computer Facilities, Alberta Education, 1985.

Software Copyright/ Selection

As of November, 1988, Canada's Copyright Act has been amended by Bill C-60. In phase one of Bill C-60 computer programs are defined as "literary works" and consequently, all provisions applying to literary works under the Act apply to computer programs.

The new act specifically states that the copyright owner of a computer program has the **exclusive** right to produce or reproduce the program in any material form whatsoever. When software is purchased, the purchaser owns the object containing the software program and can use the program the same way that a purchaser of a book can use a book. It is important to remember that ownership of copyright is not transferred to the purchaser, only the permitted use of the software.

The owner of an authorized copy of a computer program may make a single back-up copy but the back-up copy may not be legally used unless the authorized copy is destroyed or rendered inoperative. A back-up copy therefore may not be used on a second computer station. In fact, the law states that the back-up copy must be destroyed if the purchaser ceases to own the authorized copy of the program.

Copying a computer program includes loading the program into the memory of the computer at the initial booting up stage as well as copying the program onto another computer, hard disk, or floppy disk. Once the software has been copied into memory, a copy of the software has been made. Additional booting, including networking, or multiple booting constitutes copyright infringement. This means that unless otherwise stated in the licensing agreement for the software, one program disk is required for each computer. This is also true for programs that load completely into the computer memory and do not return to the disk drive.

The Copyright Act provides for the following possible penalties:

1. upon summary conviction, a person is liable to a fine of up to $25 000.00 or imprisonment for a term of up to six months, or both; or,

2. upon conviction or indictment, a person is liable to a fine of up to $1 million or imprisonment for up to five years, or both.

The Crown Prosecutor has the discretion to use a summary conviction process or an indictable offense process depending upon his or her perception of the seriousness of the offense.

Software Licensing

Licensing Agreements often augment the minimum provisions outlined in the Copyright Act and stipulate the permitted use of the software with respect to the number of copies that can be made and the number of computers on which the software can be used. There are four licensing agreements that are of interest to schools and school districts.

1. District Licence – upon payment of a fee, copies may be made or acquired for computer stations within the district. Usually the cost is determined by the number of computer stations within the district.
2. Site Licence – allows a school to purchase a program and make as many copies of the program as needed for use in that school site by the teachers and students of that school. The cost of a site license may be a standard amount or determined by the enrollment of the school.
3. Lab Licence, or lab pack – the software is licensed for use within a single classroom in a school.
4. Station Licence – the software is licensed for use on one computer station at a time.

Software developers/distributors often have differing policies in regards to licensing arrangements. You can often make your own special licensing arrangements by contacting the software company directly.

Software Selection

All software used in the classroom should be evaluated before use. Alberta Education evaluates software and determines the curriculum fit. A comprehensive listing of all approved software is published in the *Computer Courseware Evaluation Catalogues*. The most recent catalogue and all basic and support software are available through the Learning Resources Distributing Centre (LRDC). For more information, see the Software Evaluation section of this TRM. For the LRDC address, see Program Support Resources.

Long-Term Program Planning

Together with the school's administration, develop a long-term plan for the program. If that involves program building, this can best occur where there is:

- a qualified computer studies teacher who is committed to continuous professional development
- computer studies offered at Grades 7, 8 and 9
- an extracurricular computer studies club
- adequate facility
- an adequate budget
- respect and value for computer technology among staff, administration and students.

Suggested Activities for Program Building

- Plan for student computer clubs, computer fairs, open house display, etc.

- Ensure extracurricular program is open to all students, not just computer studies students.

- Keep accurate yearly records of program expenses and revenues so that trends can be documented for budget planning.

- Participate in appropriate personal professional development activities whenever possible.

- Communicate "new" developments, programs, etc., at regular staff meetings.

- Ensure that teaching resources are the most current available.

- Assist in other school activities, such as posters, newspapers, yearbook, newsletters to parents.

- Plan for computer integration across the curriculum by allowing time for other subject areas to use computer facilities.

EVALUATION

Software Evaluation

All software used in the classroom should be evaluated before use. This should be done by either Alberta Education's Curriculum Branch, local school boards or individual teachers.

To assist individual teachers in their evaluation, the accompanying checklist is provided. In this case, all four of the criteria under Educational Content should be met and as many of the remaining criteria as possible. The larger the latter group of criteria, the simpler the program should be to use. However, this is left to the individual teacher's discretion.

Software Evaluation Checklist

Educational Content

1. Content is accurate and meets with the learner expectations of Alberta Education curriculum. __________
2. Content is free of bias, prejudice, intolerance and stereotyping. __________
3. Content (including difficulty and reading levels) is appropriate for intended users. __________
4. Content is presented in an interesting manner. __________
5. Content is presented in a manner consistent with the philosophy of the program. __________

Presentation

6. Directions are clear and easy to follow. __________
7. Methods of interaction are consistent. __________
8. Content is presented in small incremental steps from easy to more difficult. __________
9. On-screen assistance is provided (e.g., tutorial, help-screen, etc.). __________
10. Feedback is appropriate, effective and varied. __________
11. User has control over all or parts of the program. __________
12. Can be adapted to a variety of classroom situations and skill levels. __________
13. Students can access menu to change activities. __________
14. User inputs can be easily corrected (does not crash when wrong key pressed). __________
15. The presentation takes advantages of the attributes of a computer. __________

Technical Design

16. Screen displays are well-designed and easy to read. ______
17. Is free of errors in grammar, spelling and punctuation. ______
18. Is reliable and technically sound. ______
19. Documentation is clear and complete. ______
20. Students can work with minimal teacher supervision. ______
21. Provides support material (student assignments, workbooks, etc.). ______
22. Management is flexible and easy to use. ______
23. Provides back-up copies (or can be made). ______

Management Options

24. Has record keeping capabilities. ______
25. Some means of evaluation is included. ______
26. There is a management component/option allowing teacher authoring (skill level, questions added, etc.). ______

Possible Uses

To present new information ______
To provide guided practice ______
To provide self–directed practice ______
To provide some type of evaluation ______
To motivate ______
To enrich ______

Overall Evaluation

Excellent ____ Good ____ Adequate ____ Poor ____

Student Evaluation

Evaluating students is necessary in all subject areas to inform both students and their parents of progress, as well as to allow the teacher to check the success with which concepts, skills and attitudes are being learned.

Evaluation is continuous and should use as many different methods as possible. Observations, checklists, journals and logs, reports, projects, tests, displays and group work are some of the methods available. Regardless of what method of evaluation is used, students should always be made aware of exactly how they are to be evaluated.

Computer studies should be a growing experience for all concerned (both student and teacher), and so more than production should be taken into account when evaluating students. A participation or effort component is one way to build in more flexibility in evaluation. An observation checklist (such as the one included in this section) might be used for that purpose.

Since modules differ in length and level of difficulty, it is appropriate that they be weighted proportionately for report card marks. In addition, the tasks within a module will vary, and may also be weighted proportionately.

Example: Final mark in computer studies.

Name	Module	Mark(%)		Weighting(%)	Weighted Score
Student A	1	100	×	.05	5.0
	6	85	×	.10	8.5
	7	50	×	.15	7.5
	11	60	×	.30	18.0
	16	65	×	.25	16.25
	21	40	×	.15	6.0
				1.00	61.25

Attitude Checklist

	3	2	1
1. Demonstrates respect for equipment, resources and facilities.			
2. Responds well to direction and procedures.			
3. Assumes responsibilities for his/her actions.			
4. Makes use of time and resources.			
5. Follows through on individual and group activities.			
6. Shows desire to improve and learn from mistakes.			
7. Generates imaginative and creative solutions when problems arise.			
8. Demonstrates willingness to try new programs, projects, etc.			
9. Is resourceful in planning independent activities.			
10. Shows willingness to apply knowledge to other subject areas.			
11. Helps and supports other students in classroom activities.			
12. Feels responsible for putting forth his/her best effort daily.			
13.			
14.			

3 - EXCELLENT
2 - GOOD
1 - NEEDS IMPROVEMENT

Program Evaluation

Part of every computer studies teacher's responsibility is to monitor the delivery of the curriculum. The purpose of this is to provide feedback on the effectiveness of each module and how to improve it for subsequent teaching sessions.

The use of the following form is suggested for evaluating any given module.

Module Evaluation

Module ____

1. What learner expectations went well?

2. What learner expectation did not go well?

3. Was level of difficulty appropriate?

4. Were equipment and resources adequate?
   If not, what should be used next time?

5. Was the software used appropriate?

6. Suggestions for improvement next time.

Teacher Self-Evaluation

As all professionals must routinely assess their effectiveness, teacher self-evaluation should be regarded as an essential and continuous process. The following are some indicators, intended only as a guide to teacher self-evaluation. Flexibility in interpretation is encouraged.

Do I . . . ? **Lesson Presentation . . .** 1. Communicate instructions, directions and expectations.			
2. Choose activities appropriate to level of group.			
3. Vary the presentation of lessons, activities and assignments.			
4. Involve all students in activities.			
5. Outline specific goals for each lesson.			
6. Prepare adequately (lesson and physical set-up) for class.			
7. Make assignments relevant and sufficiently challenging.			
Teaching Techniques 8. Adapt lessons by using ideas and suggestions presented by students.			
9. Accommodate individual differences and learning styles.			
10. Clearly state evaluation policies.			
11. Have enough time to work with individual students.			
12. Set tasks that are (and are perceived to be by the student) within their abilities.			
13. Distribute materials efficiently in class.			
14. Establish and maintain procedures and routines set at the beginning of the year.			
Teacher-Pupil Relations 15. Show respect for and demand respect from students.			
16. Provide a positive learning environment in classroom.			
Professional Responsibilities 17. Participate in professional development activities (inside and outside of school).			
18. Assume responsibilities for some extra-curricular computer activities within the school.			
19. Use all possible resources (school and community) within the classroom.			
20. Maintain effective communication with parents on student progress.			
21. Plan jointly with other staff teaching computer studies (if others are involved).			
22. Plan jointly with other staff to integrate the use of computers in other subject areas.			

PROGRAM SUPPORT RESOURCES

The program support resources section contains annotations, lists and sources of resources that may be used in the computer studies program. The lists have been arranged in alphabetical order of the major primary resource headings.

Alberta Education

Operating out of each of the five regional offices are complementary subject consultants. Typically, they will be able to assist teachers by facilitating:

- workshops in specific areas of curriculum
- information and direction on resources, facilities and program implementation
- program evaluation
- contacts with other computer studies teachers.

Zone I

Grande Prairie Regional Office
5th Floor, Nordic Court
10014–99 St.
Grande Prairie, Alberta
T8V 3N4
Telephone: 538–5130

Zones II and III

Edmonton Regional Office
Westcor Building
12323 Stony Plain Road
Edmonton, Alberta
T5N 3Y5
Telephone: 427–2952

Zone IV

Red Deer Regional Office
3rd Floor West
Provincial Building
4920–51 Street
Red Deer, Alberta
T4N 6K8
Telephone: 340–5262

Zone V

Calgary Regional Office
Room 1200
615 MacLeod Trail S.E.
Calgary, Alberta
T2G 4T8
Telephone: 297–6353

Zone VI

Lethbridge Regional Office
Provincial Building
200–5 Avenue South
Lethbridge, Alberta
T1J 4C7
Telephone: 381–5243

Regional Resource Libraries

Films and videos are available for loan through the five centres listed below. In some instances, computer software is also available for preview purposes. A complete catalogue of holdings is available upon request for a nominal fee.

Zone 1
Film Supervisor
Zone One Regional Film Centre
P.O. Box 6536 / 10020–101 Street
Peace River, Alberta
T8S 1S3
Telephone: (403) 624–3178

Zones II and III
Film Supervisor
Central Alberta Media Service (CAMS)
2017 Brentwood Boulevard
Sherwood Park, Alberta
T8A 0X2
Telephone (403) 464–5540 / 467–8896

Zone IV
Operations Manager
Alberta Central Regional Education Services (ACRES)
County of Lacombe
Box 3220 / 5140–49 Street
Lacombe, Alberta
T0C 1S0
Telephone: (403) 782–5730

Zone V
Film Supervisor
South Central Alberta Film Federation (SCAFF)
Westmount School
Box 90 / Wheatland Trail
Stathmore, Alberta
T0J 2H0
Telephone: (403) 934–5028

Zone VI
Film Supervisor
Southern Alberta Regional Film Centre (SARFC)
McNally School
P.O. Box 845
Lethbridge, Alberta
T1J 3Z8
Telephone: (403) 320–7807

Urban Media Centres

Director
Learning Resource Service
County of Strathcona
2001 Sherwood Drive
Sherwood Park, Alberta
T8A 3W7
RITE: 147-2711

Coordinator of Instruction
Red Deer Public School Board
4747-53 Street
Red Deer, Alberta
T4N 2E6
Telephone: (403) 343-1405
RITE: 151-0111

Supervisor
Instructional Materials
Calgary Separate School Board
6220 Lakeview Drive SW
Calgary, Alberta
T3E 6T1
Telephone: (403) 246-6663
RITE: 161-0111

Supervisor
Education Media
Calgary Board of Education
3610 Nine Street SE
Calgary, Alberta
T2G 3C5
Telephone: (403) 294-8540
RITE: 161-0111

Learning Resource Consultant
Edmonton Public School Board
Centre for Education
Edmonton, Alberta
T5H 4G9
Telephone: (403) 429-8320
RITE: 147-2711

IMC Manager
Medicine Hat School District
601 First Avenue SW
Medicine Hat, Alberta
T1A 4Y7
Telephone: (403) 526-1323

Supervisor
Curricular Resources
St. Anthony's Teacher Centre
10425-84 Avenue
Edmonton, Alberta
T6E 2H3
Telephone; (403) 439-7356
RITE: 147-2711

The National Film Board

The National Film Board maintains regional offices in both Calgary (P.O. Box 2959, Station M, Calgary, T2P 3C3), and Edmonton (North West Centre, 9700 Jasper Avenue, Edmonton, Alberta).

The NFB loans films free of charge (out of town borrowers must pay return postage) and videos for a small fee. Titles are indicated in the *NFB Film Catalogue* (available at a small cost) and the *Video with a Difference* catalogue (free).

Borrowers must obtain a library card, for which there is no charge. There is a maximum lending time, and a nominal fine for overdues.

ACCESS Network

ACCESS Network offers a variety of resources and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS audio and video-tapes copied. ACCESS also offers a service called "Night Owl Dubbing." This allows educators to tape late-night educational programs directly from their own televisions.

ACCESS Network publishes both an Audio-Visual Catalogue and a comprehensive schedule of programming, available on request.

An excellent video series is available from ACCESS entitled "MicroComputers for Learners." The program is designed for teachers who have limited or no knowledge of computers. The series is designed to help teachers explore the potential of microcomputers as productivity tools for the classroom. The program consists of thirteen 15- to 25-minute programs. When ordering the program be sure to request the Workshop Activity Guide as well.

For additional information contact:
ACCESS Network
Media Resource Centre
295 Midpark Way S.E.
Calgary Alberta
T2X 2A8
Telephone: 1-800-352-8293
(in Calgary 256-1100)

Curriculum Branch

Alberta Education, through the Curriculum Branch, acquires and evaluates software for Alberta curriculum. Software approved is listed in the computer courseware evaluations catalogue, which is published yearly (except for 1990). Approved resources in the catalogue are rated as basic, support or other learning resources. All resources rated basic or support are readily available from the Learning Resources Distributing Centre at discounted prices. The computer courseware evaluation and the LRDC catalogues should be available from your school library or by writing the LRDC, Alberta Education, 12360 – 142 Street, Edmonton, Alberta, T5L 4X9 or telephoning (403) 427–2767.

Alberta Teachers' Association Computer Council (ATACC)

The Computer Council is a division of the Alberta Teachers' Association and offers services in the areas relevant to the use of the computer in schools. Some of the councils professional activities include:
- publisher of professional newsletters and journals
- host of an annual conference
- assistance in establishing Regional Councils
- an electronic bulletin board service to interested members
- inservices and computer-related activities throughout the year
- presentations at conventions, regionals and local workshops.

For additional information, contact ATA Computer Council, The Alberta Teachers' Association, Barnett House, 11010-142 Street, Edmonton, Alberta, T5N 2R1.

Periodicals/ Journals (annotated)

Periodicals and journals are often the most current source of information available. It is therefore recommended that where budgets permit, school librarians should subscribe to periodicals and journals that can be used for both teacher and student references. If you plan to purchase several subscriptions, consider contacting a subscription agency. They can sometimes arrange a discount. See your librarian for subscription agency names. The following is an annotated list of titles that have been useful to computer studies teachers.

Classroom Computer Learning
The magazine features articles and reviews on educational activities, opportunities for programming, software and hardware developments. Published 8 times/yr for $22.50 U.S.
Peter Li Inc.
2451 East River Road
Dayton, Ohio
45439
(513) 219-5785

Compute
The focus of the magazine is the use of computers at home, work and in school. Regular columns include features on Amiga, Apple, Atari St, Commodore, IBM PC, Tandy and compatible machines. Published monthly for $24.00 U.S.
Compute Publications Inc.
P.O. Box 10955
Des Moines, Iowa
50347-0955
(919) 275-9809

Computers in Education
The focus of this magazine is the use of computers in the classroom. All articles are written by educators. Published 10 times/yr for $28.00.
Moorshead Publications Ltd.
1300 Don Mills Rd.
Toronto, Ontario
M3B 3M8
(416) 445-5600

Computers in the Schools

Published for educators and administrators with articles that emphasize theory and practical applications of computers in schools. Published quarterly for $28.00 U.S.

Haworth Press Inc.
12 W. 32nd Street
New York, New York
10001
(800) 342-9678

The Computer Paper

A free magazine, available through computer stores or by subscription. This newspaper format magazine covers Ms-Dos, MacIntosh, Amiga and Atari news, as well as other news items/reviews of interest for the personal computer user. Published monthly for $19.95.

The Computer Paper-Alberta Edition
P.O. Box 6144 Station D
Calgary, Alberta
T2P 2C7
(403) 262-5737

Computing Teacher

Articles include software, classroom projects, teaching suggestions, programming ideas and "copy me" pages. Published 9 times/yr for $12.50 U.S. ($31.00 foreign).

International Council of Computers in Education
University of Oregon
1787 Agate Street
Eugene, Oregon
97403-1293
(503) 686-4429

Educational Technology

For educators involved with computer technology. Articles provide excellent information on telecommunication, C.A.I., educational television and electronic media in the classroom. Published monthly for $99.00 U.S.

Educational Technology Publication Inc.
721 Palisade Avenue
Englewood Cliffs, New Jersey
07623
(201) 871-4007

Electronic Learning

Geared for teachers from K-12, articles are a source of current ideas and information on the applications and advances in technology education.

Scholastic Inc.
730 Broadway
New York, New York
10003-9538
(212) 505-3000

InCider
Geared specifically for Apple computer users, articles are on programs, programming, hardware, software, games, peripherals and applications. Now incorporates content from A + magazine. Published monthly for $24.97 U.S.
IDG Communications
80 Elm Street
Peterborough, New Hampshire
03458
(603) 924-9471

Input
A free magazine, available through computer stores or by subscription. This newspaper format magazine covers Ms-Dos, MacIntosh, Amiga and Atari news, as well as other news item/reviews of interest for the personal computer user. Of particular interest are the current listings of computer bulletin board numbers throughout Western Canada.
Published monthly for $8.00.
Input
P.O. Box 5676, Station L
Edmonton, Alberta
T6C 4G1
(403) 465-7277

PC Magazine
Feature articles are on review of computer hardware and business software. Published biweekly for $34.97 U.S.
Ziff-Davis Publishing Co.
One Park Avenue
New York, New York
10016
(212) 503-5100

PC World
Columns contain information on hardware/software reviews, questions and answers, and product announcements. Published monthly for $29.90 U.S.
P C W Communications Inc.
501 Second St. Ste. 600
San Francisco, California
94107
(415) 851-3861

Publish
A magazine designed solely for the desktop publisher. Articles contain valuable information on how to, tips and techniques as well as software reviews. Published monthly for $39.95 U.S.
Publish
Subscription Department
P.O. Box 51967
Boulder, Colorado
80321-1967
(800) 274-5116

A glossy magazine devoted to the Atari ST/Mega ST computers. The magazine includes feature articles, reviews and departments carrying news and reviews of the Atari series of computers, peripherals and software. Published monthly for 87.95 U.S. (with disk) - available at distributors for $4.95 Canadian without disk.
Antic Publications Inc.
544 Second Street
San Francisco, California
94107

Teaching and Computers
This publication is an excellent source of information for teachers. Features include articles on application of computers in the classroom with "Electronic Lesson Plans" and classroom useable materials. An excellent ideas source.
Published 6 times/yr for $23.95 U.S.
Scholastic Inc.
730 Broadway
New York, New York
1003-9538
(212) 505-3000

TechTrends
Articles cover the latest developments in technology from news briefs and product announcements. Published bimonthly for $24.00 U.S. (non-members).
Association for Educational Communications Technology
1126-16th Street
N.W. Washington, District of Columbia
20036
(206) 466-4780

Journals from other subject areas often have information about the integration of computers.

Telecommunications

The following is a list of on-line information services that you may wish to subscribe to for use in the telecommunications module of your program. This list identifies potentially useful on-line resources. The responsibility to evaluate these prior to use rests with your local jurisdiction. The list is not an exhaustive one. Check your local library for a complete list of machine readable data bases and on-line services.

ASPEN
Alberta Special Education Network
6240–113 Street
Edmonton, Alberta
T6H 3L2
(403) 422–6326

Provides services to educators and parents of special needs students. On-line registration, call 1-880-0040 (data only). Communications package should support VT-100 terminal emulation at either 300 or 1200 baud—set communications parameters to No Parity, 8 data bits, 1 stop bit.

- Offers a weekly news service on special education news.
- Forums and messaging related to special education as well as a reference library.
- Private e-mail to educators.

ATANet
ATACC, The Alberta Teachers' Association Computer Council
11010-142 Street
Edmonton, Alberta
T5N 2R1
(403) 453–2411

- ATANet is free to registered members of ATACC but you must also have an iNET 2000 account (contact AGT for details).
- Affiliated with iNET, Envoy 100 for messaging provides notice boards with information on software, hardware, sources of funding for educational computer projects, names and numbers of electronic bulletin boards throughout the province and more.
- Provides a student bulletin board and e-mail.
- Gateways through iNET connect to CompuServ, The Source, Chimo and many others.

BRS Information Technologies
555 East Lancaster Avenue
4th Floor
St. Davids, Pennsylvania
19087
(800) 468–0908

- Offers discounts to K–12 educational institutions.
- One-time subscription fee and a monthly charge.
- BRS instructor designed for teaching students to search on-line.
- Data bases accessible by 300, 1200 and 2400 baud modems.
- Offers over 150 bibliographic and full-text data bases in a variety of subject areas.

CompuServ
5000 Arlington Centre Boulevard
P.O. Box 20212
Columbus, Ohio
43220
(800) 848–8199

- No educational discount but rates comparable to other discounted services.
- Gateway provides users with access to over 800 data bases.
- One time subscription fee includes free initial connect time.
- Connect time rates vary with the baud rate.
- Information sources include education, shopping, entertainment, travel, on-line software exchange and special interest forums.

Delphi
General Videotex Corporation
3 Blackstone Street
Cambridge, Massachusetts
02139
(800) 544–4005 or (617) 491–3393

- No educational discount.
- Access to an assortment of news, information and communications services.
- One-time subscription includes two free hours of connect time.
- Connect time rates the same for all baud rates.

Dow Jones Information Service
P.O. Box 300
Princeton, New Jersey
08540
(800) 257–5144

- Provides information from financial, business and industry data bases.
- Reduced rates for academic institutions, faculty members or students.
- Rates vary with baud rate.
- No start-up fee or monthly minimum charge.

Einstein
Learning Link
Educational Broadcasting Corporation
356 West 58 Street
New York, New York
10019
(212) 560–6613

- School version of EasyNet.
- Access to 85 data base of interest to students and educators.
- No subscription fee, pricing is based per search.
- Flexible and easy to use, uses single search passwords, which reduces student on-line time and cost.
- Available at reduced rates through the Learning Link and the "Einstein Starter Kit."

E-Zoot

A messaging/bulletin board service for teens in the Edmonton area.

- Available 24 hours a day.
- Call 427–4267 for more information.

Genie

General Electric Corp.
401 N. Washington Street
Rockville, Maryland
20850
(800) 638–9636

- Features e-mail, news, and special interest groups.
- Offers access to Grollier's Encyclopedia and downloadable public domain software.
- Non-prime time hourly rate is inexpensive and varies between 300, 1200 baud and 2400 baud.

InfoGlobe

The Electronic Publishing Division of the Globe and Mail
444 Front Street West
Toronto, Ontario
M5V 2S9
(416) 585–5250

- Offers a variety of on-line services to news, stock market, business reports and others.
- Subscribers can choose data base packages of specific services (e.g., news package, financial package).
- Supports 300, 1200 and 2400 baud with most popular communications software.

APPENDIX: HANDOUTS FOR PHOTOCOPYING

COMPETENCY CHECKLIST: MODULE 11, WORD PROCESSING - INTRODUCTION

Date ____________________ Student's Name ____________________	S	N
Uses correct vocabulary in describing the operation of the software (e.g., file, document, word wrap, cursor, scrolling, screen display).		
Can explain the advantages of a word processor (e.g., on-screen editing, speed, accuracy).		
Describes the difference between a stand-alone word processor and word processing software.		
Demonstrates the steps necessary to use basic functions of a word processing package such as: **File Management** load an existing file		
save a file to disk		
create a document from scratch		
delete a file		
rename a file		
WordProcessing enter text		
cursor movement		
print a file		
delete text		
find and replace text		
move and copy text		
Can produce and print an error-free document.		
Can compose a document at the keyboard.		
Has used a word processing software package to complete an assignment from another subject area.		

Recommendations: ____________________

Teacher's Signature ____________________

STUDENT RECORD

Name ____

Address ____

Phone Number ____

Last School Attended ______________________ Grade Completed ____________

History
Check off those modules of instruction completed in previous years.

Applications Modules

____ Module 1 – Computer Operations
____ Module 2 – Software Overview
____ Module 3 – Graphics Software Applications
____ Module 4 – Desktop Publishing: Introduction
____ Module 5 – Desktop Publishing: Advanced

Keyboarding Modules

____ Module 6 – Keyboarding: Introduction
____ Module 7 – Keyboarding: Full Keyboard
____ Module 8 – Keyboarding: Extension
____ Module 9 – Keyboarding: Intermediate
____ Module 10 – Keyboarding: Advanced

Productivity Modules

____ Module 11 – Word Processing: Introduction
____ Module 12 – Data Bases
____ Module 13 – Spreadsheets
____ Module 14 – Electronic Communications
____ Module 15 – Word Processing: Extension

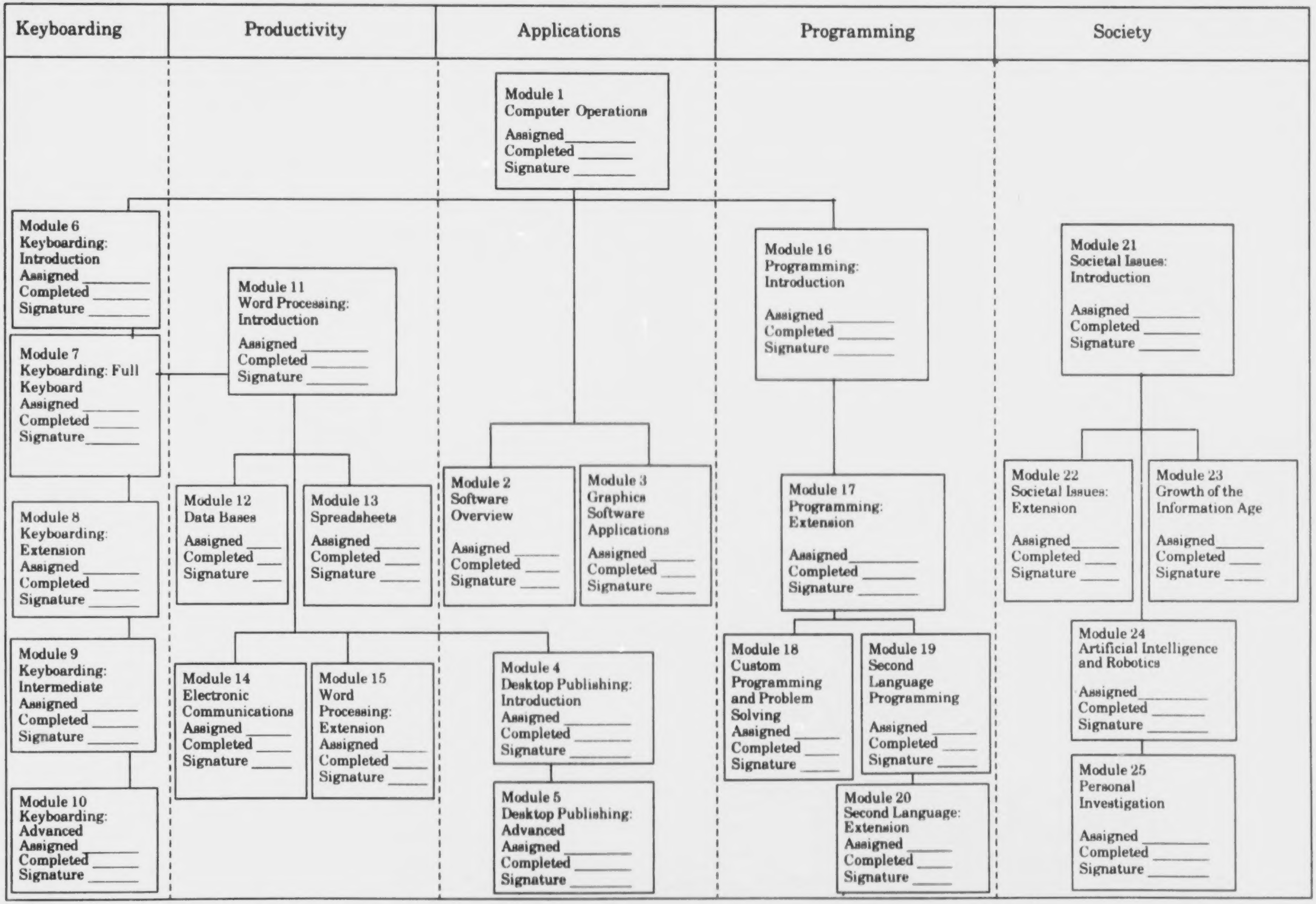
Programming Modules

____ Module 16 – Programming: Introduction
____ Module 17 – Programming: Extension
____ Module 18 – Custom Programming and Problem Solving
____ Module 19 – Second Language Programming
____ Module 20 – Second Language: Extension

Society Modules

____ Module 21 – Societal Issues: Introduction
____ Module 22 – Societal Issues: Extension
____ Module 23 – Growth of the Information Age
____ Module 24 – Artificial Intelligence and Robotics
____ Module 25 – Personal Investigation

MODULE[illegible]MPLETION RECORD Student Name ______________________ Grade __________ Date __________



Keyboarding	Productivity	Applications	Programming	Society

Module 1
Computer Operations
Assigned ________
Completed ______
Signature ______

Module 6
Keyboarding: Introduction
Assigned ______
Completed ______
Signature ______

Module 7
Keyboarding: Full Keyboard
Assigned ______
Completed ______
Signature ______

Module 8
Keyboarding: Extension
Assigned ______
Completed ______
Signature ______

Module 9
Keyboarding: Intermediate
Assigned ______
Completed ______
Signature ______

Module 10
Keyboarding: Advanced
Assigned ______
Completed ______
Signature ______

Module 11
Word Processing: Introduction
Assigned ______
Completed ______
Signature ______

Module 12
Data Bases
Assigned ____
Completed ___
Signature ___

Module 13
Spreadsheets
Assigned _____
Completed ____
Signature _____

Module 14
Electronic Communications
Assigned _____
Completed ____
Signature ____

Module 15
Word Processing: Extension
Assigned _____
Completed ____
Signature ____

Module 2
Software Overview
Assigned _____
Completed ____
Signature ____

Module 3
Graphics Software Applications
Assigned _____
Completed ____
Signature ____

Module 4
Desktop Publishing: Introduction
Assigned ______
Completed ______
Signature ______

Module 5
Desktop Publishing: Advanced
Assigned ______
Completed ______
Signature ______

Module 16
Programming: Introduction
Assigned ______
Completed ______
Signature ______

Module 17
Programming: Extension
Assigned ______
Completed ______
Signature ______

Module 18
Custom Programming and Problem Solving
Assigned _____
Completed ____
Signature ____

Module 19
Second Language Programming
Assigned _____
Completed ____
Signature ____

Module 20
Second Language: Extension
Assigned _____
Completed ____
Signature ____

Module 21
Societal Issues: Introduction
Assigned ______
Completed ______
Signature ______

Module 22
Societal Issues: Extension
Assigned _____
Completed ____
Signature ____

Module 23
Growth of the Information Age
Assigned _____
Completed ____
Signature ____

Module 24
Artificial Intelligence and Robotics
Assigned ______
Completed ______
Signature ______

Module 25
Personal Investigation
Assigned ______
Completed ______
Signature ______

NOTE: Fill in dates for each module assigned and completed.

DAILY PLANNING RECORD

Week of ____________________

Class ____________________

Module __ Students: __________ __________ __________ __________ __________	Notes:
Module __ Students: __________ __________ __________ __________ __________	Notes:
Module __ Students: __________ __________ __________ __________ __________	Notes:
Module __ Students: __________ __________ __________ __________ __________	Notes:
Module __ Students: __________ __________ __________ __________ __________	Notes:

LESSON PLANNING SHEET

Theme:

Module:

Learner Expectation:

Clarification of Expectation/Description:

Elective Suggestions:

Teacher Preparation:

Student Preparation:

Resources:

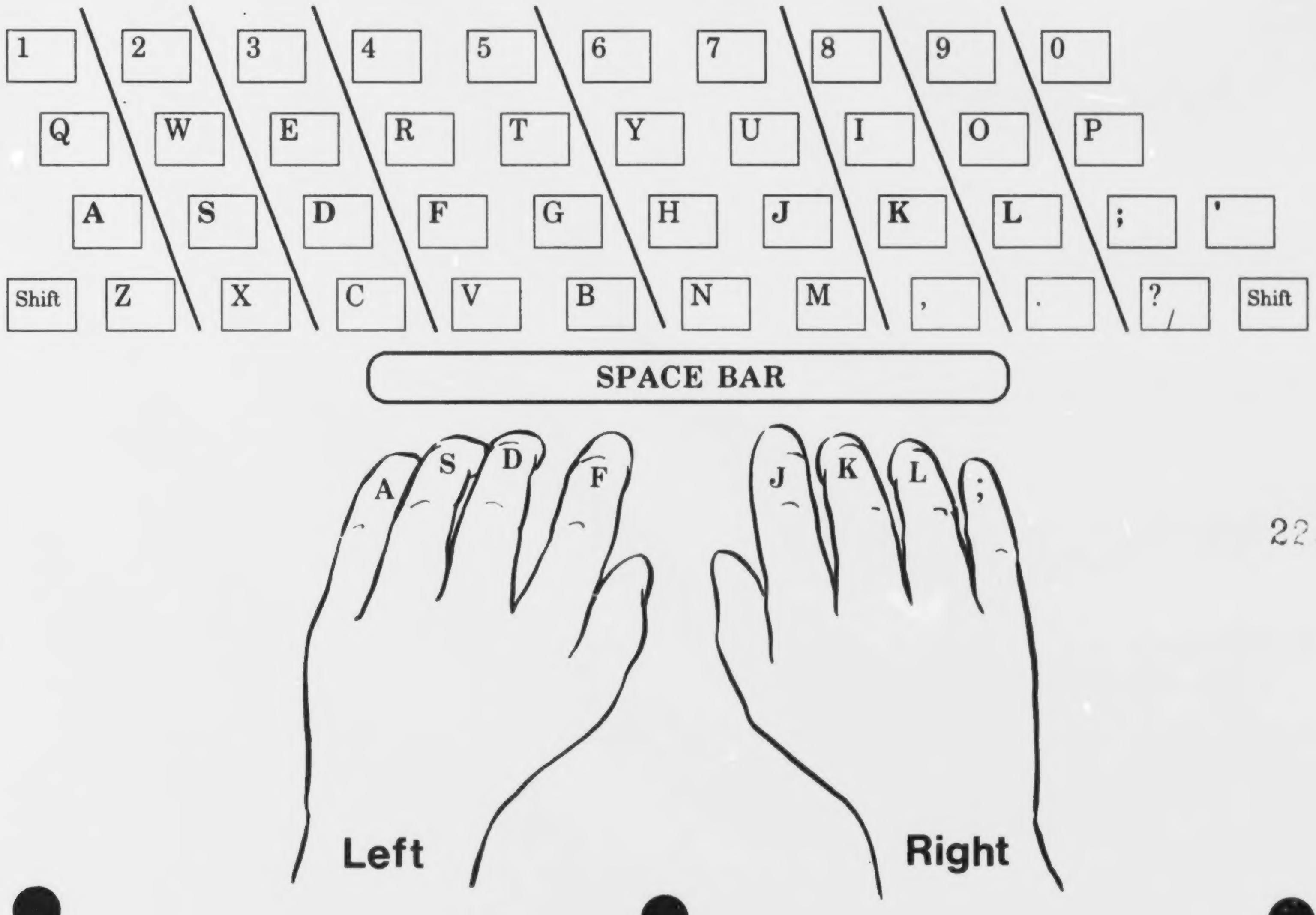
Suggested Activities:

Evaluation:

Teaching Tips:

Post-Lesson Comments:

Correct Finger Position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6
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T
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;
'
Shift
Z
X
C
V
B
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M
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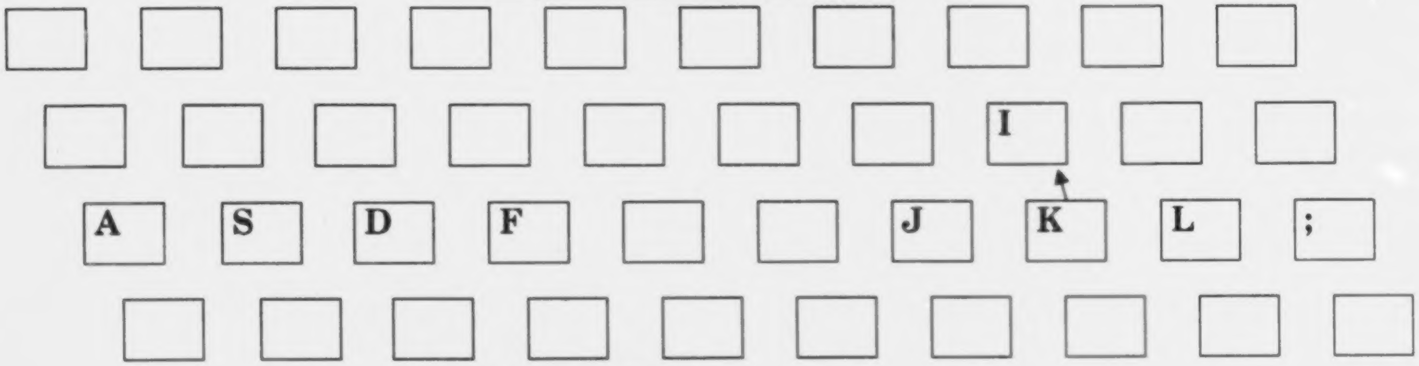
.
?/
Shift
SPACE BAR
A
S
D
F
J
K
L
;
Left
Right

Sample Drill Copy



Warm-up Drill

1 jjj fff jf fj fjf lll ddd ld dl dld
2 kkk sss ks sk sks ;;; aaa ;a a; a;a
3 all fall lad fad dad ask sad lass ;
4 a lad falls; a sad asks; salad;

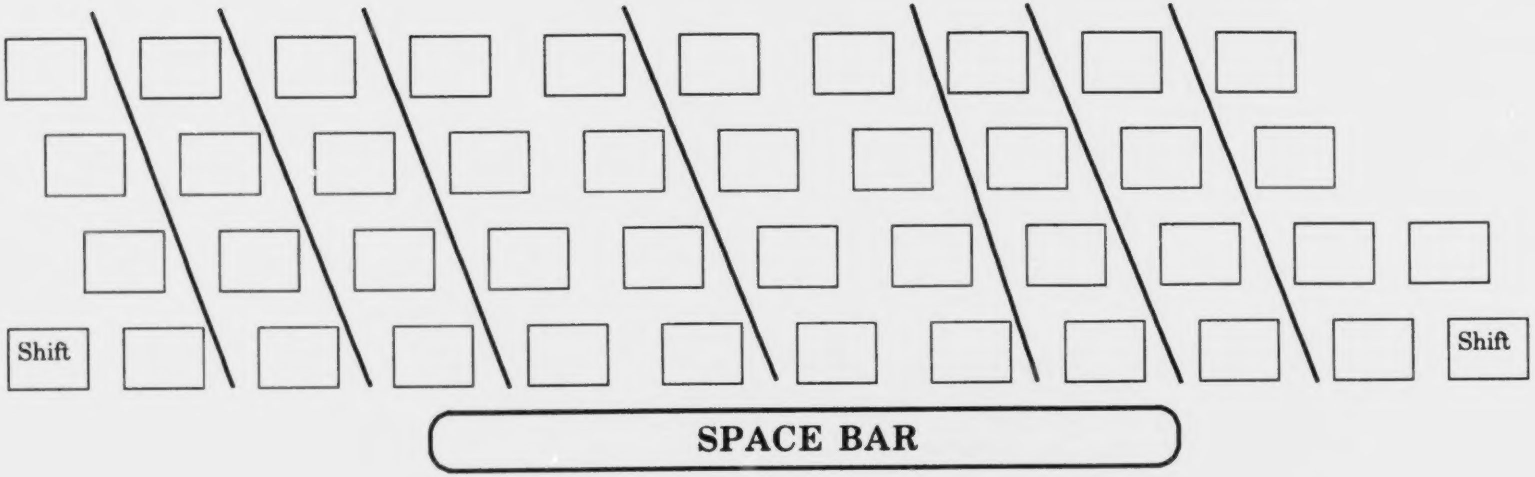
5 kkk kik kk ki ki kk ii kik kik kk i
6 kkk kik kk ki ki kk ii kik kik kk i
7 kik kik ki ki ik ik kiik kk iki iii
8 kik kik ki ki ik ik kiik kk iki iii

Drill on the I Key

9 kid did lid aid ski ail ill if kids
10 ill fill ail fail sails dials skill
11 if kids kiss; did dad dial; if skis
12 if a sail fails; if all disks fail;

- -
1 2 3 4 5 6 7

Blank Keyboard


Shift
Shift
SPACE BAR

KEYBOARDING TECHNIQUE EVALUATION

Student's Name ________ Grade ________	G	S	NI
Eyes on copy			
Correct posture at the computer Body erect in chair			
Feet flat on the floor			
Correct finger and hand position			
Correct fingers used for keys			
Wrists kept level (no arch, no dip)			
Comments			
Attitude and behaviour			
Comments			

G = Good S= Satisfactory NI = Needs Improvement

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KEYBOARDING EVALUATION CHECKLIST

Class:____________________________ **Grade:**______________________

	Eyes on Copy					Body Erect					Feet Flat					Stroking					Wrists					Total
	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	E	G	S	NI	P	

5-point scale: Excellent – Good – Satisfactory – Needs Improvement – Poor

TELECOMPUTING WITHOUT A MODEM

1. NULL MODEM CABLES: One way to simulate telecomputing with students is to connect two computers with a null modem cable. Don't run out and buy one, however on an Apple, your printer cable is also a null modem cable. Connecting two GS's, two Macintosh's, or a IIgs and a Mac is easy. Simply plug the printer cable into the two modem ports, boot up your communications software, and, voila, you are on-line.

   To connect your IIe to a IIgs or Macintosh, you will need a super serial card set to modem. The cable from your super serial card to your Imagewriter printer will work as the null modem cable between the two computers.

   Your communications software must support a null modem. (ProTerm for the Apple is one example.) If you set the on-line parameters to half duplex, you can see what you are typing. And, what you're typing will appear on the other screen. This is not a complete simulation because the feedback and prompts of an e-mail or bulletin board system will be missing. It does give students practice in communicating by writing, in using the composing and editing features of the software, and in uploading files to the other computer.

   Creative teachers will invent other interesting ways to use this connection. If you have an idea to share, please send it to ATANET.ADMIN and we'll post it for your colleagues to read.

2. KID MAIL FOR APPLE IIe, IIgs: KID MAIL is a public domain, disk-based simulation of electronic mail and bulletin boards. It makes a marvelous station activity when you have only one computer in your classroom and has been used successfully from elementary to high school as an introduction to telecomputing.

COMPETENCY CHECKLIST

Sample Checklist for Module 16, Programming – Introduction BASIC

Date ______________________________ Student's Name ______________________	S	N
Student can: • boot, catalog and run programs for a given disk.		
• code and save simple programs (including use of REM statement).		
• edit and debug simple programs.		
• position text on screen (using VTAB, HTAB).		
• vary print on screen (using NORMAL, INVERSE, FLASH).		
• use GOTO statement in simple branching techniques.		
• use computer to perform simple mathematical calculations.		
• draw simple Lo-Res pictures.		

S – Satisfactory

N – Needs Improvement

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COMPETENCY CHECKLIST

Sample Checklist for Module 16, Programming – Introduction Logo

Date ______________________________ Student's Name ______________________	S	N
Student can: ● draw simple shapes (geometric and non-geometric).		
● draw several shapes on the same page.		
● code and save simple shapes with titles or labels.		
● output to disk, screen and printer.		
● edit and debug simple programs.		

S – Satisfactory
N – Needs Improvement

CODING SHEET

Name: ____

Program Saved Under: ______________________________

New	
10	HOME

CODING SHEET (continued)

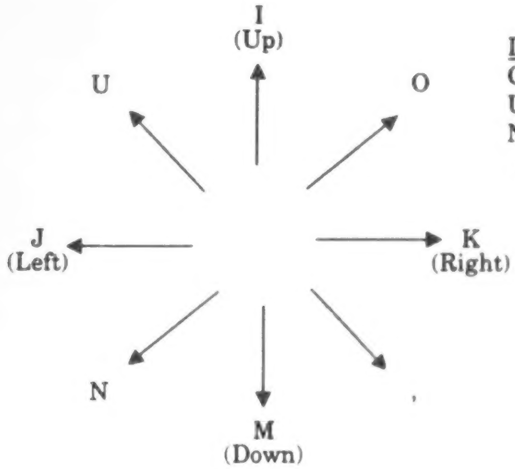
(2)

New

Enter, RUN, correct an error and SAVE if required.

MASTER GRAPHICS LO-RES SKETCHER

Movement Keys



Diagonal
O - Up and right
U - Up and left
N - Down and left
, - Down and right

Controls at a Glance

X – used to set X and Y coordinates
Y – used to set top X and Y for Box
C – list colours
H – to HOP followed by movement keys (H again to resume)
S – to save
L – to load
? – to get help (or/will also get help)
R – to replace a colour

CONTROL L – also loads program
CONTROL C – clones one area to another
CONTROL B – draws a box
CONTROL R – reverses the picture
CONTROL F – folds picture symmetrically
CONTROL X – zaps the screen with current colour
CONTROL T – rotates picture 1/4 turn clockwise
CONTROL P – repeat patterns from home area
CONTROL E – enlarges home quadrant to fill screen

RETURN gets you back to sketcher

How to Erase Your Picture

Press CONTROL–RESET keys to get out of MASTER GRAPHICS program. Type RUN and your screen is now clear and ready for another picture. (If you want to KEEP your picture, don't forget to SAVE before typing RUN.)

TO BE USED WITH MODULE 16 LO-RES GRAPHICS

APPLE TEXT SCREEN

HTAB →

VTAB ↓

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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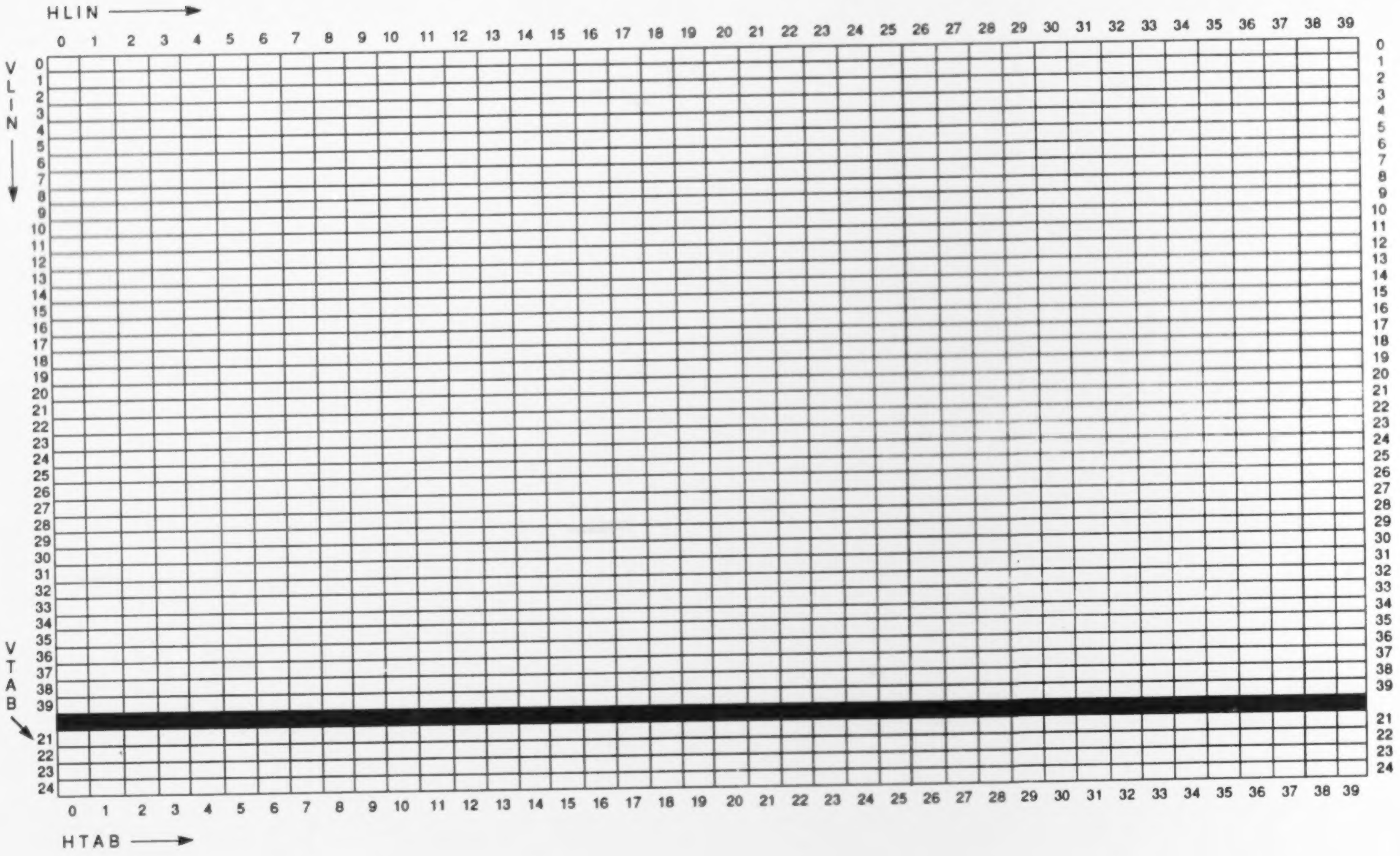
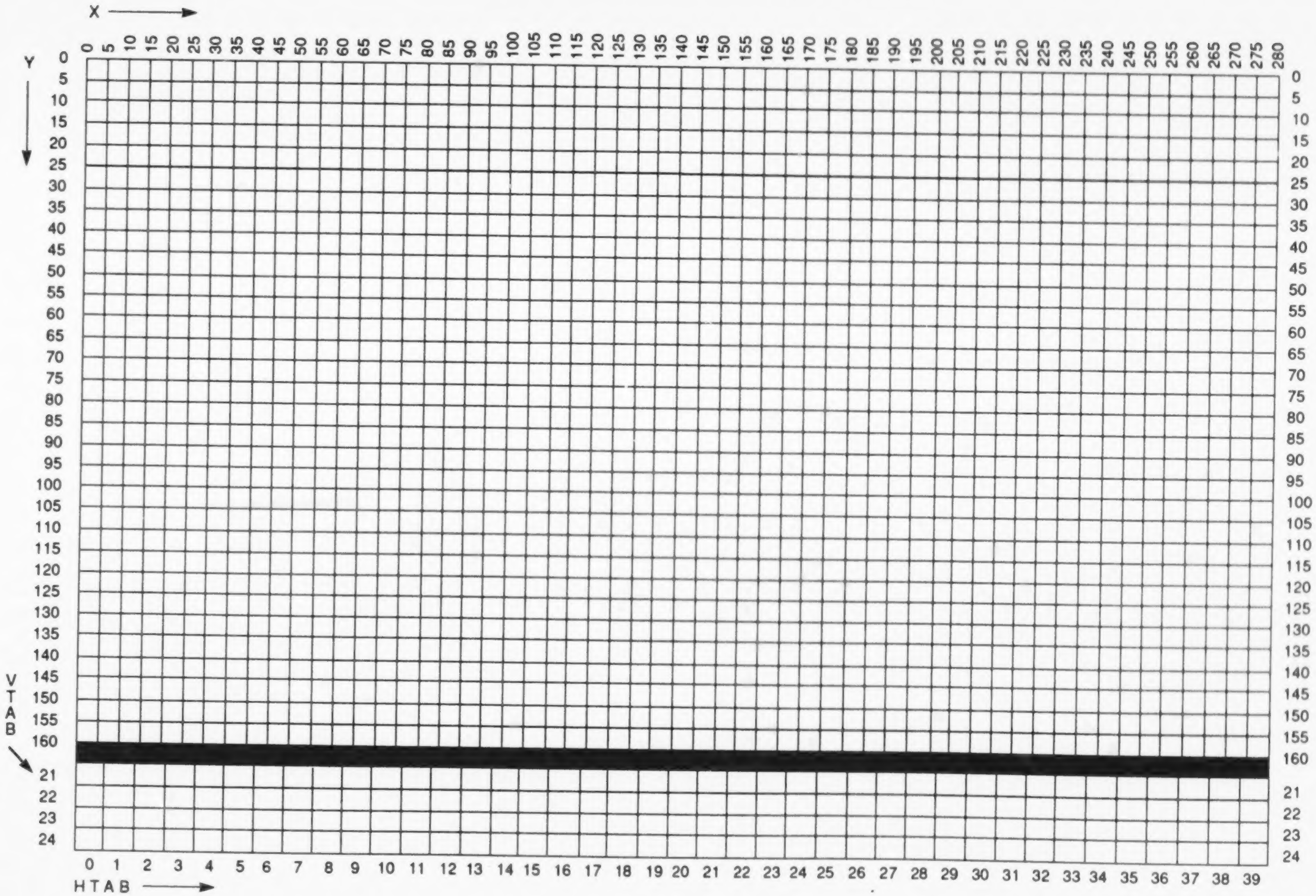
APPLE LO-RES GRAPHICS SCREEN


HLIN
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
VLIN
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
VTAB
21 22 23 24
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
HTAB

APPLE HI-RES GRAPHICS SCREEN


X
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280
Y
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160
VTAB
21 22 23 24
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
HTAB

EVALUATION OF STUDENT-WRITTEN COMPUTER PROGRAMS

Name: ______________________ Date Submitted: ______________________

Total Mark: ____/______________________

PROGRAM NAME	/5	/-2 (Max)	/ + 1 (Max)	/4	
Don Blackwell					/10
George Campsall					/10

/5	Program works as instructions indicate. Then it gets marks.
/-2 (Max)	Program works but with some inaccuracies or awkwardness. Then marks are taken away to a maximum of 2.
/ + 1 (Max)	Program works but has additional sophistication. Then marks are added to a maximum of 1.
/4	Program has specified documentation. Flow charts and/or coding sheets (if applicable). Then it gets marks.

COMPUTER ROOM RULES

1. Food and drink are not allowed in the computer room.
2. Horseplay of any kind is prohibited at all times.
3. Observe proper disk handling procedures and return all computer disks to their protective jackets when not in use.
4. Return all software to its proper storage area.
5. Students may only make copies of public domain software.
6. Only approved legal programs are to be used in this computer room.
7. Be considerate of others, be sure your work station is clean and neat before you leave at the end of class.
8. Do not move the computer equipment unnecessarily as this increases the risk of damage.
9. Plan your work so that it is saved five minutes before class ends.
10. Touch-typing is strictly enforced in this program.
11. Avoid unnecessary use of the on–off switch. Use alternative methods to boot a disk.
12. Open and close the disk-drive door carefully. Leave it open when not in use.
13. If in doubt ask for help.

GLOSSARY

Application Software:	Computer programs that perform such tasks as word processing, data manipulation or electronic spreadsheets.
Abacus:	A tablet with beads strung on ten wire rows, used to perform mathematical calculations in ancient times.
Abstract Picture:	Any picture representing an abstract thought (e.g., charts or graphs).
Access Code:	A password used to gain entry to a computer system.
Address:	A location in computer memory.
Analoga:	Continuous signal that varies in pitch and amplitude.
Analogical Picture:	One or more concrete objects that share an important attribute with an abstract concept.
Arithmetic Operators:	Computational symbols used in mathematical operations.
Array:	A group of storage locations that have a variable name in common.
Artificial Intelligence:	Computers designed to emulate human thinking and characteristics.
BACK (BK):	Reverses direction turtle will move (Logo programming command).
BASIC:	Stands for a Beginner's All-purpose Symbolic Instructional Code, and is a programming language.
Baud Rate:	Synonymous with bits per second, the number of times a second that data transmission signals change. With each change, one or more bits of information can be transmitted.
BLOAD:	A command to load a Binary program from disk to computer's memory (Apple programming command).
Boot:	To start up a computer by loading a program into memory.
Branch:	To go somewhere else within a program.
Bug:	A mistake in a computer program.
BUTFIRST (BF):	Outputs a word or list with all but the first character or element (Logo programming command).
BUTLAST (BL):	Outputs a word or list with all but the last character or element (Logo programming command).
CALL:	A statement used to execute a machine-language program (Apple programming command).
CATALOG:	A command used to list programs on a disk (Apple programming command).

Catalogue:	A list of programs on a disk.
Category:	Another term for a field in a data base. A category contains specific information such as an address or phone number.
Cell:	The location in an electronic spreadsheet where a row and a column intersects.
Central Processing Unit (CPU):	The "brains" of the computer; the part of the computer that processes information.
Chat Mode:	A setting used in communications software to allow immediate communication between two computer terminals.
CHR$(4):	Used with PRINT command to produce an automatic carriage return (Apple programming command).
CHR$(7):	A statement used to make the computer "beep" (Apple programming command).
CLEARSCREEN (CS):	Clears the graphics screen and shows turtle in home position (Logo programming command).
Clip Art:	A collection of graphic images that can be individually manipulated and imported into application software.
Clipboard:	In Appleworks (and other application software), the clipboard is a temporary storage area used when transferring data from one file space to another.
Clutter:	A lot of unnecessary material displayed on screen.
Coding Sheet:	A sheet used to record a program before entering into computer.
COLOR:	A command used to select colour in low-resolution graphics mode (Apple programming command).
Column:	A vertical line of space in a screen display or vertical section in a spreadsheet.
Command:	Instructions given to a computer in immediate mode.
Computer:	An electronic device that stores, and changes programmed information as directed by a programmer.
Computer Integration:	The use of the computer as a learning tool in classroom studies.
Computer Networking:	A collection of computers that are connected together through cables and can share computer peripherals and data.
Computer System:	Computer hardware and software.
Configure:	To set the variables/parameters of a software package to match a particular microcomputer system.

Copyright:	Exclusive rights given to the author, publisher or distributor of software for the sole right of reproduction and distribution.
Crash:	A breakdown in a computer system software or hardware.
Cryogenics:	The science of low temperature phenomena.
Cursor:	The flashing box/line or underline that indicates where the text will be inserted on the screen.
DATA:	Information used with the READ statement.
Data:	Information entered into a computer (Apple programming command).
Data Handling (processing):	The process of gathering, recording, storing and retrieving data.
Debug:	To correct a mistake in a computer program.
Delay Loop:	A loop that pauses, counts to itself and then continues program.
Desktop Publishing (DTP):	A process that uses a microcomputer, printer and desktop publishing software to produce newsletters and other publications.
Digital:	Computer data is encoded digitally as a series of one's and zero's, as opposed to a continuous signal in wave or analog form.
DIM:	A statement that reserves space for the requested number of elements in an array (Apple programming command).
Directory:	A listing of all the files stored on a disk. A directory may include other information such as the date the file was last modified, the size of the file and the application or program it was created with.
Disk (diskette, floppy disk, or flexible disk):	A flexible disk used to store information on.
Disk Drive:	A computer peripheral used to read and write information on surface of a disk.
Disk Operating System (DOS):	Computer software that enables the computer to carry out all disk operations.
Document:	A file created with a word processor.
Download:	Storing data that has been received by telecommunication.
Drill and Practice Software:	Electronic worksheet style of software that presents problems, accepts student responses and provides feedback.
Dynamic Modelling:	Representing a real world simulation on a computer such that variables in the simulation can be changed interactively to determine the effect of the changes.

Edit:	To change or modify a file or document.
Electronic Data Base:	A collection of information organized by categories and electronically stored in a file.
Electronic Mail (e-mail):	Messages entered on a personal computer and sent by modem to another computer terminal or a central computer for retrieval at a later date.
Electronic Spreadsheet:	An electronic ledger.
Encrypter:	A device used to scramble information sent over public telephone lines.
Encryption:	A code used to scramble data by producing output as (meaningless) characters.
END:	A statement to halt a program (Apple programming command).
Expert System:	A computer system that combines the knowledge of several experts on a subject and replicates human intelligence and reasoning in the solution of problems.
Facsimile (Fax):	A machine that is able to transmit the image of a document over a regular phoneline.
Fibre Optics:	A communication media that uses fine strands of flexible glass rod to efficiently transmit data by internally reflected light.
Field:	Another term for a category in a data base. A field contains specific information such as an address or phone number in a data base.
Fifth Generation Computers:	Are the computers of the future that use cryogenics, parallel processing and artificial intelligence.
File:	Information named and stored on a disk.
File:	A document or collection of data save on disk under a specific file name.
FIRST:	Outputs a word or list with only the first character or element printed (Logo programming command).
First-Generation Computers:	The earliest computers, which used vacuum tubes to process information.
FLASH:	A statement that causes text to flash on the screen (Apple programming command).
FOR...NEXT:	Statements which are part of a program that is repeated over and over as many times as determined by the FOR statement (Apple programming command).
Formatting Disks:	Preparing a disk for use with a particular disk operating system by encoding specific information at the beginning of each sector of the disk and identifying the location of the disk directory.

FORWARD (FD):	Moves turtle the indicated number of units in direction it is facing (Logo programming command).
Fourth-Generation Computers:	Computers using large-scale integration.
FPUT:	Outputs a list with first input followed by the elements of the second input (Logo programming command).
Function:	A formula built into a language to carry out certain calculations.
Function Keys:	Those keys that a programmer can define to perform specific functions or operations. By pressing a single function key a corresponding operation will be performed.
GOSUB:	A statement that directs the program to run a subroutine (Apple programming command).
GOTO:	A statement that directs the program to another line number (Apple programming command).
GR:	A statement that formats a screen in low-resolution graphics mode (Apple programming command).
Graphics:	Information presented in picture form.
Hacker:	A fanatical computer programmer.
Hard Copy:	Output of a file or document in printed form (e.g., text printed on paper).
Hard Disk:	A peripheral device containing one or more rigid disks capable of storing considerably larger amounts of information than a floppy disk. It is permanently mounted in a disk drive and may be connected internally or externally to a computer.
Hardware:	Computer equipment, including the central processing unit and all peripheral devices.
HCOLOR:	A command used to select colour high-resolution graphics mode (Apple programming command).
HGR:	A statement that formats screen in high-resolution graphics mode (Apple programming command).
HIDETURTLE (HT):	Makes the turtle disappear (Logo programming command).
High-Level Language:	A programming language where one instruction converts to many machine language instructions.

High-Resolution Graphics (Hi-Res):	The display of graphics on the screen 280 columns wide by 190 rows high in eight colours.
HLIN:	A statement used to draw a horizontal line in low-resolution graphics (Apple programming command).
Hollerith Card:	A punch card used with the Hollerith Tabulating Machine invented in the late 1800's by Herman Hollerith to electronically tabulate the U.S. census.
HOME:	A statement that clears the text screen and moves cursor to top left corner of screen (home position in BASIC). In Logo the turtle will move to centre of screen.
Home Robot Kits:	Robot kits designed by the manufacturer to be constructed at home with few required tools (e.g., Fishcer Technics, Lego Tc Logo and Heath Zenith Hero 2000).
HPLOT:	A statement that plots point and draws lines at specified locations in high-resolution graphics (Apple programming command).
HTAB:	A statement that moves text cursor to a particular location on horizontal axis (Apple programming command).
IF...THEN:	A statement that sends the computer to another line if the condition is true (Apple programming command).
Import Graphics:	A process whereby graphics are brought in from an outside source (graphics program) into a textual or graphics document.
Initialize (format):	To prepare a blank disk for accepting and storing programs.
Initializing Disks:	To set the format of a disk to receive data for a specific disk operating system.
INPUT:	A command used to request information from the user (Apple programming command).
Input:	Information fed into a computer.
INT (integer):	A statement that ignores the fractional part and prints only integer value (Apple programming command).
Integer:	A number without any fractional part.
Interactive Program:	(e.g., Publish It!)
Interface Selection:	(e.g., Printer Setups)
INVERSE:	A statement that prints text in reverse mode (black on white) (Apple programming command).
Keyboard:	The part of the computer on which information is typed for entry into computer.

Labels:	The print routine in Appleworks Data Base to print address labels using the labels format or titles given to the rows or columns of a spreadsheet.
LAST:	Outputs a word or list with only the last character or element printed (Logo programming command).
LEFT (LT):	Rotates the turtle counterclockwise the indicated number of degrees (Logo programming command).
LEFT$:	A function that gives you the characters at the left of a string (Apple programming command).
LEN$:	A function that counts the number of characters in a string (Apple programming command).
LET:	A statement that assigns a value to a variable (Apple programming command).
Line Number:	A number, at the beginning of a statement, that orders the steps a computer carries out.
LIST:	A command used to display lines of a program (Apple programming command).
List Files:	A procedure used to display the records found in a directory or on a disk.
LOAD:	A command used to transfer information from disk to the computer's memory (Apple programming command).
Load:	A procedure or command used to place a copy of the file or program in the computer memory.
Logic:	Chain of reasoning for the solution of a particular computer problem.
Logoff:	To sign off of a multiple user computer system.
Logon:	To sign on to a multiple user computer system; usually requiring a password.
Loop:	Part of a program that is repeated over and over.
Low-Level Language:	A programming language designed for the computer to understand.
Low-Resolution Graphics (Lo-Res):	The display of graphics on the screen 40 columns wide by 48 rows high in 16 colours.
LPUT:	Outputs a list with elements of the second input followed by the first input (Logo programming command).
Mainframe Computers:	A large-scale computer that can store vast amounts of information and perform multiple tasks at once.
Memory:	The part of the computer that stores information.

Memory Resident Software:	Software which once loaded is contained completely within the computer's memory and therefore the program does not return to the disk drive during the execution of a program.
Menu:	A list of choices given by a program.
MID$:	A function that finds characters located in the middle of a string (Apple programming command).
Modem (Modulator/ Demodulator):	An electronic device that converts computer digital signals into audio tones (modulate) that can be transmitted over phonelines and converts (demodulate) the transmitted audio tones back into binary data.
Mouse:	An input device which when moved along the desktop controls the movement of a cursor on the monitor. The user can press a button on the mouse to select options displayed on the computer monitor.
MS-DOS:	Microsoft Disk Operating System used on IBM and compatible computers.
Multiple Access:	Returns to the disk drive often to load information.
NEW:	A command used to erase computer's memory (Apple programming command).
NEXT:	Used to mark the end of a loop and causes loop to be repeated (Apple programming command).
Non-symmetric:	Not having corresponding parts the same (Logo programming command).
NORMAL:	A statement used to return text to normal print (white on black) (Apple programming command).
Null Modem:	A computer configuration whereby a cable is used to connect two computers together through the modem ports. Use to simulate data communication using communication software.
Numeric (value):	Numerals representing a number or a numeric variable.
Numeric (variable):	A memory location where numeric data is stored.
OnLine:	Connected by direct cable or telephone line to a computer system.
OnScreen Editing:	Editing where changes to a document are immediately displayed on the screen.
Output:	Information coming out of a computer.
Parallel Processing:	Program code is partitioned into sections and executed simultaneously at a high rate of speed. An analogy would be if you had two loads of washing—parallel processing would have you use two machines instead of one to finish in half the time.
PARSE:	To scan the command line of a program to determine the action to be performed (Logo programming command).

Pathnames:	The sequence of volume and subdirectory names that specifies the location of a specific computer file.
PEEK:	Used to print what is stored in specified memory locations (Apple programming command).
PENCOLOR (PC):	Indicates the current pen colour (Logo programming command).
PENDOWN (PD):	Moves pen down so that it may draw as it moves (Logo programming command).
PENUP (PU):	Causes turtle to leave no trace as it moves (Logo programming command).
Peripherals:	Any piece of equipment attached to and used with the computer
Pictograph:	Same as rebus.
Pixel (picture element):	Tiny dot of light used to display graphic pictures.
PLOT:	A statement that colours specified squares a certain colour in low-resolution graphics (Apple programming command).
POKE:	Used to store a binary number in a specified memory location (Apple programming command).
PR#0:	Command to turn off printer (Apple programming command).
PR#1:	Command to turn on printer (if interface is in slot 1) (Apple programming command).
PRINT:	Statement used to print information enclosed inside quotation marks (Apple programming command).
Procedure:	Method of defining words in terms of words that are already known (Logo programming command).
ProDos:	Professional disk operation system used in Apple II computers.
Program:	A set of instructions to be carried out by a computer.
Programmer:	The person who writes instructions to be performed by a computer.
Prompt:	A line in a program that prompts the user for the next instruction.
Public Domain Software:	Software that can be freely copied and distributed as the programmer has waved copyright.
RAM (Random Access Memory):	Temporarily stores information and instructions entered by the computer user. The CPU can write to and read from RAM.
Random (RND):	A function used to generate random numbers between 0 and 1.

READ:	A statement that gets information from DATA statement (Apple programming command).
Rebus:	Pictures in place of words.
Recursion:	A programming feature that allows a subroutine to call up itself.
REM (remark):	A statement used to label or make programs clearer. Computer ignores this line in carrying out instructions.
Remote Data Bank:	Information stored at some distance from its point of use and accessed through telecommunications.
REPEAT:	Outputs a list the indicated number of times (Logo programming command).
Representational Pictures:	A graphic representing something specific and recognizable.
RETURN:	A statement used to send program back to main program from subroutine (Apple programming command).
RIGHT (RT):	Rotates the turtle clockwise the indicated number of degrees (Logo programming command).
RIGHT$:	A function that gives the characters at the right of a string (Apple programming command).
ROM (Read Only Memory):	Stores permanent information that cannot be changed by the computer user. The CPU can read from ROM, but cannot write to it.
RUN:	A command to carry out a program (Apple programming command).
SAVE:	A command used to name and store a program on disk (Apple programming command).
Second-Generation Computers:	Computers using transistors.
SETBG:	Changes the background to indicated colour (Logo programming command).
SETPC:	Sets colour turtle will leave as it moves (Logo programming command).
SHOWTURTLE (ST):	Causes turtle to appear (Logo programming command).
Simulation Software:	Allow students to experience real life events in the safety of the classroom. Activities that would otherwise be dangerous, time-consuming, or expensive can be simulated by the computer.
Software:	All computer programs.
SPEED:	A statement used to the change speed at which text will be printed on the screen or procedures executed (Apple programming command).

Stand-Alone Word Processor:	Is a dedicated computer designed solely for the purpose of word processing. The program code resides in ROM.
Statement:	Ordered instruction given to a computer.
STEP:	A statement that signals that additional action is to take place (Apple programming command).
String:	A character or set of characters inside quotation marks.
String Variable:	The name of a memory location where string values are stored.
Structured Programming:	Coding programs that have a main program and a group of subroutines.
Subprocedure:	A procedure that is used as part of the definition of another procedure (Logo programming command).
Supercomputers:	Fifth-generation computers that use parallel processing to execute instructions at a very high rate of speed (200 -300 mips -millions of instructions per second). Examples of Supercomputers are the CRAY computers at the University of Toronto and University of Calgary. Supercomputers are used to perform simulations (e.g., simulation of weather patterns for weather forecasting).
Symmetric:	Having corresponding parts the same (Logo programming command).
Syntax:	The rules governing the structure of the computer language.
Syntax Error:	A message indicating a mistake in structure (e.g., spelling, punctuation) has been entered.
TAB:	Used with PRINT to move cursor indicated number of spaces horizontally (Apple programming command).
TEXT:	A command used to change screen from graphics to text (Apple programming command).
Text:	Any character entered by using the keyboard.
TEXTLEN:	Is a command that reports the length of the text on the page (Logo programming command).
TEXTPOS:	Is a command that reports the current locations of the cursor (Logo programming command).
Third Generation Computers:	Computers using integrated circuits.
Top Down:	A method of programming in which main program is written first, followed by subroutines.

Trojans:	Program code embedded within a program and designed to trigger on a certain condition (e.g., time of day/year, execution of a portion of the program code). When triggered it can cause interruption of the program or damage.
Turtle:	A computer-controlled symbol that responds to Logo commands (Logo programming command).
Tutorial:	A program that instructs on the use of a larger program.
User:	The person operating a computer.
User Friendly:	Program that is easy for anyone to use.
Variable:	A place in the memory of a computer where a specific value can be stored or a symbol used in a program to represent such a place.
Vector Processing:	Computer processing that takes place in a lineal fashion.
Viruses:	Program code that once within the operating system of a computer will replicate itself to fill the available memory. It may also infiltrate other programs throughout from the operating system.
VLIN:	A statement used to draw vertical lines in low-resolution graphics.
VTAB:	A statement that moves the text cursor to a particular location on vertical axis (Apple programming command).
Words-A-Minute (W.A.M.):	The amount of copy produced measured against time, usually in one minute increments.
Worm:	Program code that resides within one specific program. Program designers have used worms to guard against copyright infringement of software by designing a worm that would destroy the program once a copy is made.